

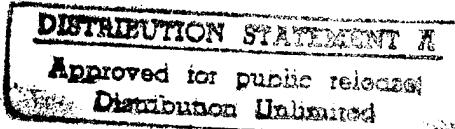
CENTER FOR  
HEALTHCARE EDUCATION  
AND STUDIES

**THE READINESS TRAINING PROGRAM  
FOR NURSING PERSONNEL IN THE AMEDD**

**Volume II**

**TRAINING SUPPORT PACKAGE**

**HR 95-003 B  
March 1996**



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**UNITED STATES ARMY  
MEDICAL DEPARTMENT CENTER AND SCHOOL  
FORT SAM HOUSTON, TEXAS 78234-6125**



**DEPARTMENT OF THE ARMY**  
U.S. ARMY MEDICAL DEPARTMENT CENTER AND SCHOOL  
FORT SAM HOUSTON, TEXAS 78234-6100

REPLY TO  
ATTENTION OF



**3 OCT 1995**

MCCS-HN (350)

**MEMORANDUM FOR Leaders and Trainers Who Will Oversee and  
Implement the Readiness Training Program**

**SUBJECT: Implementation of the Readiness Training Program**

1. The Readiness Training Program has been developed to help nursing personnel develop and sustain their proficiencies in clinical skills and functions critical to the successful performance of their roles in a deployed or field status.
2. In keeping with the Army Medical Department (AMEDD) mission of maintaining the medical, clinical, and technical readiness of medical units and personnel to support the Army in the theater of operations, each of you is asked to support the widest possible implementation of the Readiness Training Program among all nursing personnel in the AMEDD.
3. The Training Support Package contains training guidelines and actual training objectives that will facilitate use of the program among nursing personnel in both the Active and Reserve Components of the AMEDD. Additionally, videotapes for the Readiness Training Program are available at training and audiovisual support centers to assist trainers with planning an initial assessment of the skill and knowledge proficiency of nursing personnel in their unit.
4. The point of contact for the Readiness Training Program at the U.S. Army Medical Department Center and School is the Chief, Department of Nursing Science, DSN 471-8231 or commercial (210) 221-8231. Point of contact at the U.S. Army Forces Command (FORSCOM) is the Chief Nurse, FORSCOM, DSN 367-7327 or commercial (404) 669-7327.

JOHN J. CUDDY  
Major General, DC  
Commanding

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13. ABSTRACT (Maximum 200 words) The US Army Medical Department Study Board tasked the Center for Healthcare Education & Studies (CHES), US Army Medical Department Center & School (AMEDDC&S) to conduct two readiness studies. The purposes of the studies were to describe the readiness competency of nursing personnel in the active and reserve components of the US Army Medical Department (AMEDD) and to develop a program that would meet identified training needs. This Training Support Package (TSP) describes the Readiness Training Program (RTP) that is the product of these two studies. The purpose of the TSP is to provide leaders and trainers with information and materials needed to implement the RTP for nursing personnel in their unit/Medical Treatment Facility (MTF). Included in the TSP are an explanation of the training program as well as task summaries for clinical skills and battle-focused functions (BFFs). Principles of training as well as management of the training program are discussed.		
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## PREFACE

### Background

Nursing personnel responsible for conserving the fighting strength need to maintain their competencies in skills and functions critical to their roles in a deployed or field status. In the past, nursing personnel have relied on their everyday experiences in fixed healthcare facilities to maintain their competencies in field nursing practice. However, there is now a widening gap between nursing practice in high-technology, automated fixed healthcare facilities and nursing practice in field medical treatment facilities. Therefore, the Joint Services Nursing Advisory Group (JSNAG), which is a tri-service advisory group to the Defense Medical Standardization Board (DMSB), recommended that a study be conducted to examine the extent to which job-related and training experiences currently prepare nursing personnel for patient care in a deployed or field status.

In response to JSNAG's recommendation, the US Army Medical Department Study Board tasked the Center for Healthcare Education & Studies (CHES), US Army Medical Department Center & School (AMEDDC&S) to conduct two readiness studies. The purposes of the studies were to describe the readiness competency of nursing personnel in the US Army Medical Department (AMEDD) and to develop a program that would meet identified training needs. This Training Support Package (TSP) describes the Readiness Training Program (RTP) that is the product of these two studies.

The purpose of this TSP is to provide leaders and trainers with information and materials needed to implement the RTP for nursing personnel in their unit. Included in the TSP are an explanation of the training program as well as task summaries for clinical skills and battle-focused functions (BFFs). Principles of training as well as management of the training program are discussed.

### Acknowledgments

Numerous nursing personnel in the active and reserve components of the AMEDD have contributed to the successful completion of the readiness studies and this TSP. To develop a training program that could be used by nursing personnel in the varied training environments within the AMEDD, it was critical (a) that a core group of nurses with expertise in field nursing guide the readiness studies and (b) that nursing personnel who would eventually use the RTP provide input into the development of both the RTP and this TSP. Following is an attempt to recognize groups of individuals who have made major contributions to the TSP, with mention of a few outstanding individual contributors.

While in the position of Chief Nurse, FORSCOM, COL Susan McCall served as the study director for the first readiness study, and she continued to provide guidance for the second study. COL McCall selected a core group of nurses with expertise in field nursing to help guide these two studies. These nurses met with COL McCall prior to the first study to discuss the

conceptualization of the readiness project, and they served on an expert panel throughout the course of both studies. Their names and positions at the time they came together as a group are as follows: COL Morgan, CN, 62nd Medical Group; COL Tiernan, CN, 1st Medical Group; and COL Chudy, CN, 55th Medical Group.

Other subject matter experts also provided consultation for the readiness studies. COL Schaeberle, CN, 44th Medical Brigade, served on the expert panel with this core group of nurses for both readiness studies. COL Scherb served on the expert panel for the first readiness study; she also contributed to the review of the TSP and provided valuable written materials for task summaries in the TSP.

During the second readiness study, COL Bartz, Chief, Department of Nursing Science, AMEDDC&S, worked with COL McCall to oversee development of the Readiness Training Program (RTP). Also during this study, the following nurses met with the other subject matter experts to discuss the RTP: (a) COL Anderson, CN, 818th Medical Brigade, USAR (b) LTC Koehler, CN, 55th Medical Group, and (c) LTC Hofman, Chief, Team S2/S3, Ireland Community Hospital.

The readiness studies on which this TSP is based could not have been completed without the nursing personnel who participated as subjects and their unit leaders. Also, the directors and personnel at the 41st CSH, Fort Sam Houston, Texas; the Camp Bullis DEPMEDS site; and several of the Regional Training Sites-Medical made possible the use of their training areas as data collection sites. LTC Trimble, Director of the Fort Indiantown Gap RTS-MED, and her staff were particularly instrumental in the development of this TSP through their early implementation of the RTP at their training site and their valuable input to drafts of the TSP.

Nursing personnel from various units in the active and reserve components of the AMEDD volunteered to serve as evaluators for the competency-based exercise during the two readiness studies. These evaluators fulfilled their duties as data collectors in addition to their responsibilities in their own units. Some evaluators, such as MAJ Keller and MAJ Poole, made extraordinary efforts to attend as many data collection sessions as possible and volunteered for extra responsibilities, such as assisting with training new evaluators and providing input into the content and format of the TSP.

Several evaluators also contributed to the development of three videotapes designed to be used as part of the TSP. The videotapes demonstrate the assessment of training needs in clinical skills. CPT Anzelon played the part of the evaluator on all three videotapes. The following individuals played the part of nursing personnel being tested in their readiness clinical skills: LTC Hagan, LTC Voyles, MAJ Robinette, CPT Smith, SFC Kessler, SSG Greeder, and SGT Alford.

Many other nursing personnel with field experience in the active and reserve components of the AMEDD also provided valuable input to the two readiness studies and to the development of the TSP. For example, LTC Janny, CRNA, developed the testing materials for clinical skills

related to use of the anesthesia equipment. MAJ Burnett, CRNA; MAJ Albee, CRNA; and MAJ Garrett, CRNA added to these and other CRNA materials so they could serve as training guidelines. COL Chudy developed the first drafts of task summaries for the infection control BFFs, and CPT Anzelon wrote the drafts for many other BFF task summaries.

Many nursing personnel have reviewed the content and format of TSP drafts to ensure its accuracy and usefulness for a wide variety of training environments in the AMEDD. Reviewers of the TSP include expert panel members of the readiness studies; Brigade, Group, and TOE Chief Nurses; AMEDDC&S staff officers and instructors; and training and staff officers in the reserve components of the AMEDD. Some reviewers, such as COL Scherb and LTC Young, JSNAG Chairperson, provided valuable reviews themselves and also were instrumental in obtaining reviews from others with the required subject matter expertise. Additionally, LTC Eller and Mr. Howard Deck of the Department of Combat and Doctrine Development, AMEDDC&S, contributed greatly to the TSP by reviewing Chapters 1 and 3 for doctrinal accuracy.

Finally, I wish to acknowledge those associated with the Medical Research Fellowship Program at the Walter Reed Army Institute of Research (WRAIR) for providing me with the resources and environment I needed to work on the readiness studies and prepare this TSP while carrying out my other responsibilities at WRAIR. At the same time, Mr. Jim George, Ms. Pat Twist, and Ms. Diane Willette at CHES continued working with me to coordinate the printing and distribution of the RTP documents, to include this TSP.

Those who have contributed to the development of this TSP offer it to all nursing personnel in the AMEDD as a means of developing and sustaining their readiness to provide patient care in a deployed or field status. This TSP is meant to be a living document that will make possible the realization of the Readiness Training Program (RTP) goals. It is the responsibility of those who use this TSP to evaluate its usefulness to nursing personnel in their unit/MTF and to submit their suggestions for revisions and additions to future editions of the TSP through appropriate channels (see Appendix D).

Unless stated otherwise, masculine nouns and pronouns used in this TSP do not refer exclusively to men.

-- Julie K. Zadinsky  
LTC, AN  
Medical Research Fellowship Program  
Walter Reed Army Institute of Research

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# **CHAPTER 1**

## **THE READINESS TRAINING PROGRAM**

### **Background**

The mission of the US Army Medical Department (AMEDD) is *to conserve the fighting strength* of the US Army. The AMEDD is responsible for maintaining the medical, clinical and technical readiness of medical units and personnel to support the Army in the theater of operations. In peacetime, the majority of nursing personnel in the active and reserve components of the AMEDD work and train in specialized clinical roles in high-technology fixed facilities. They use state-of-the-art, automated equipment and rely on specialized clinical support services, such as pharmacy and respiratory therapy, to provide patient care.

At the same time, these nursing personnel must be ready to provide patient care in a deployed or field status. In this status, nursing personnel must work in more generalist and expanded nursing roles in a variety of field environments, and they must use medical equipment designed to be functional under field conditions. They must also provide patient care in the field without some of the automated equipment and specialized support services which they have become accustomed to using in fixed healthcare facilities.

Nursing and other personnel in the AMEDD currently receive military training through the US Army Medical Department Center and School (AMEDDC&S), Regional Training Sites - Medical, and their units. This training provides personnel with a general knowledge base, collective training, and combat casualty care instruction needed to function in their field nursing roles. For example, the AMEDDC&S provides courses such as the Officer Basic Course (OBC) and the Basic Noncommissioned Officer Course (BNCOC) for all personnel. Some personnel also complete other military courses such as the Combat Casualty Care Course (C4). At Regional Training Sites-Medical, personnel participate in collective training focused on setting up their treatment facility in a field environment. Units provide personnel with common task training.

Because of the widening gap between nursing practice in high-technology, automated fixed healthcare facilities and field medical treatment facilities (MTFs), nursing personnel also need training in the clinical roles they will perform in a field environment. This training should focus on clinical skills and functions that are critical to patient care in a field environment, but are not routinely performed in fixed facilities. The Readiness Training Program (RTP) has been designed to meet these training needs of nursing personnel in the active and reserve components of the AMEDD.

As used in this Training Support Package (TSP), readiness refers to the initial abilities of nursing personnel to perform their patient care role when placed in a field environment. This includes the ability of nursing personnel to deploy and employ without unacceptable delays (JCS Pub 1-02). Readiness competency or proficiency, which refer to the abilities of nursing personnel

to perform tasks critical to their patient care role in a deployed or field status, can be measured on a continuum ranging from the novice to the expert level.

The readiness training described in this TSP will enable nursing personnel to become more expert in their ability to provide patient care in a field environment. As nursing personnel become more expert in their field clinical skills and functions, they also will experience increased confidence in their ability to provide patient care in a deployed or field status. Nursing personnel with this increased sense of self-confidence will experience less fear of the unknown and will be able to function at a higher level when placed in a field environment.

### **Basic Premises**

Following are the three basic premises of the Readiness Training Program (RTP): (a) There are basic differences between clinical nursing practice in tables of distribution and allowances (TDA) and tables of organization and equipment (TOE) medical treatment facilities; (b) there are functions that nursing personnel perform in support of patient care or unit management in a field environment that are unique to the field setting; and (c) training resources are limited. A brief explanation of these three premises is given here to enhance the reader's understanding of the RTP goals.

#### Differences Between TDA and TOE Clinical Nursing Practice

In peacetime, nursing personnel develop and sustain their competencies in entry-level and advanced clinical skills used in their specialized areas of practice in fixed healthcare facilities. In the active component (AC) of the AMEDD, most nursing personnel work in TDA facilities during peacetime. In the reserve components (RC) of the AMEDD, many nursing personnel work in civilian fixed healthcare facilities during peacetime. In most of these military and civilian facilities, nursing personnel function in specialized clinical roles in a high-technology, automated environment.

When in a deployed or field status, both AC and RC nursing personnel work in TOE facilities in a field environment. In this field environment, nursing personnel function in expanded clinical roles, performing skills they do not ordinarily perform in fixed facilities. Nursing personnel use more generalist nursing skills in a field environment, where they must provide nursing care for patients with a wide range of battle injuries and disease and nonbattle injuries (DNBI). They also must function in the field environment without much of the automated equipment and specialized support services commonly available in fixed facilities.

#### Uniqueness of Functions Supporting Field Clinical Practice

Functions performed by nursing personnel in support of patient care or unit management differ from fixed facilities to the field environment. To provide patient care in the field, nursing personnel must perform functions requiring them to interface with systems unique to the field environment--such as command and control, medical evacuation, and medical supply systems. Other unique functions involve the application of healthcare principles--such as infection control

and sustainment principles--to patient care in a field environment. There is a unique knowledge base underlying performance of these functions in a field environment.

### Limited Resources for Training

Training resources are limited and therefore available resources must be maximized to meet identified training needs. Resources can be maximized by focusing training on selected skills and functions. Trainers should focus on clinical skills that are performed frequently or performed as life-saving measures in a field environment but are not routinely performed in fixed MTFs. Skills should be selected for training separately for each area of concentration/ military occupational specialty (AOC/MOS). Likewise, trainers should focus on functions that are critical to the support of patient care or unit management in a field environment but are not routinely performed in the same manner in fixed MTFs. These functions are referred to as battle-focused functions (BFFs).

### **Goals**

The two primary goals of the RTP will be described. Note that these goals are aimed at providing training for nursing personnel who function in a deployed or field status in one of the following roles in the active or reserve components of the AMEDD:

- Medical-Surgical Nurses (66H).
- Operating Room Nurses (66E).
- Nurse Anesthetists (66F).
- Medical Specialists (91B).
- Practical Nurses (91C).
- Operating Room Specialists (91D).

The category of medical-surgical nurses refers to all nurses who would function in a medical-surgical nursing role in a deployed or field status, even though they may not work in this role in a fixed facility. This includes nurses who work in a community health, obstetric-gynecologic, pediatric, or psychiatric nursing role.

### Goal 1: Develop Competencies in Clinical Skills

The first goal of the RTP is to develop the competencies of nursing personnel in clinical skills they perform frequently or perform as lifesaving measures in a field environment, but do not routinely perform in fixed healthcare facilities. These clinical skills can be categorized as (a) equipment skills, (b) basic skills, and (c) expanded role skills. These categories of clinical skills provide guidance for training, but they are flexible enough to accommodate the various training needs of units in different settings.

As will be discussed, trainers should individualize the skills they select for training based on their unit's mission-essential task list (METL) and the AOC/MOS of nursing personnel being trained. Following is a brief description of the three categories of clinical skills. As you study

the clinical skills in this TSP, you will note that many skills can be placed in more than one category.

#### Equipment Skills.

The first category of skills are those performed using field medical equipment, which generally are operated differently from equipment used to perform the same or similar skills in fixed facilities. For example, the 5-lead electrode system of the Hewlett-Packard cardiac monitor-recorder makes it different from most cardiac monitor-recorders in fixed facilities. The two-bottle water-seal system of the Gomco surgical suction apparatus makes it different from most suction machines in fixed facilities. Nursing personnel who know how to monitor patients on a cardiac monitor and how to manage patients on a surgical suction apparatus in fixed facilities still need training on the operation of appropriate field medical equipment to perform the same skills in a field environment.

#### Basic Skills.

The second category of skills are those performed in the field without automated equipment or specialized support services commonly available in fixed MTFs. For example, nursing personnel rely on pharmacy to provide unit dose services in fixed MTFs, but they cannot always rely on pharmacy to provide these services in a theater of operations (DMSB, 1994). Also, various types of intravenous flow meters and infusion pumps are readily available in fixed MTFs, but they are not always available in a field environment. Therefore, nursing personnel need to sustain their competencies in skills such as preparing an IV additive, calculating an oral medication dosage, and calculating the flow rate for an IV infusion.

#### Expanded Role Skills.

The third category of skills are those performed by nursing personnel in aspects of their role that are expanded from the fixed facility to the field environment. The nature of field nursing practice requires that nursing personnel be prepared to perform skills in their field nursing roles which they do not routinely perform in their fixed facility roles. Expanded role skills differ for each AOC/MOS. For example, administering a blood transfusion is an expanded role skill for medical specialists and practical nurses because most of these personnel currently do not perform this skill within their scope of practice in fixed facilities. However, administering a blood transfusion is not an expanded role skill for medical-surgical nurses because they routinely perform this skill within their scope of practice in their fixed facility roles.

Nursing personnel need to perform expanded role skills in a field environment for two reasons. First, both battle injuries and also disease and nonbattle injuries (DNBI) cut across the entire spectrum of healthcare. To be prepared to function in their patient care roles in a field environment, nursing personnel must have both a broad knowledge base of healthcare principles and also practical experience in a wide range of clinical skills critical to the care of battle injuries and DNBI commonly seen during military operations.

A second reason why nursing personnel need to perform expanded role skills in the field is that the number and acuity of patients in a field environment fluctuate depending on factors such as the intensity of conflict, but there is no backup pool of medical personnel to draw upon in times of critical need. For example, in mass casualty situations nursing personnel in a field MTF cannot expect that specialty personnel, such as a respiratory or an orthopedic specialist, will always be available to meet patient care needs. In these situations, nursing personnel must be prepared to perform skills they do not routinely perform in their fixed facility roles.

### Goal 2: Develop Proficiencies in Battle-Focused Functions

The second goal of the RTP is to develop the proficiencies of nursing personnel in battle-focused functions (BFFs), which are defined as actions performed by nursing personnel in support of patient care or unit management in a field environment. Some BFFs require nursing personnel to interface with the command and control, medical evacuation, or medical supply system when providing patient care in a field environment. Other BFFs require nursing personnel to apply infection control or sustainment principles to patient care in a field environment. Following are five categories of BFFs that are based on knowledge of these systems and principles:

- Command and Control Functions.
- Medical Evacuation Functions.
- Medical Supply Functions.
- Infection Control Functions.
- Sustainment Functions.

These categories of BFFs provide guidance for training, but they are flexible enough to accommodate the various training needs of different units. As will be discussed, trainers should individualize the BFFs selected for training based on both their unit's METL and the needs of nursing personnel being trained. Following is a brief description of the BFF categories.

#### Field Systems.

The command and control, medical evacuation, and medical supply systems are field systems that have a unique knowledge base. Nursing personnel must understand these systems so they can interface with them to provide patient care in a field environment. The following three categories include BFFs which require nursing personnel to apply their knowledge of field systems to patient care in a deployed or field status.

#### Command and Control Functions.

Command and control BFFs are actions which require nursing personnel to interface with the command and control system when providing patient care in a field environment. The command and control system is a system designed for "the exercise of command that is the process through which the activities of military forces are directed, coordinated, and controlled to accomplish the mission. This process encompasses the personnel, equipment, communications, facilities, and procedures necessary to gather and analyze information, to plan for what is to be done, and to

supervise the execution of operations" (FM 8-10-3, p. Glossary-8). The command and control system includes the use of information pertaining to the law of war. An example of a command and control BFF is to *Apply the law of war to field medical operations*.

#### Medical Evacuation Functions.

Medical evacuation BFFs are actions which require nursing personnel to interface with the medical evacuation system when providing patient care in a field environment. The medical evacuation system is a modern, complex transportation system designed to provide "the timely, efficient movement and en route care by medical personnel of the wounded, injured, or ill persons from the battlefield and other locations to MTFs. . . . Evacuation begins when medical personnel receive the injured or ill soldier and continues as far rearward as the patient's medical condition warrants or the military situation requires" (FM 8-10-6, p. 1-2). An example of a medical evacuation BFF is to *Prepare patients for evacuation by the aeromedical evacuation system*.

#### Medical Supply Functions.

Medical supply BFFs are actions which require nursing personnel to interface with the medical supply system when providing patient care in a field environment. The medical supply system is that aspect of the combat health logistics system dealing with the procurement, distribution, and storage of medical matériel, including medical-peculiar repair parts (Class VIII supplies) (FM 8-10). An example of a medical supply BFF is to *Request field medical equipment and supplies*.

#### Healthcare Principles.

Infection control and sustainment principles also have a unique knowledge base for the field environment. Nursing personnel must understand and be able to apply these principles to their patient care when working in a deployed or field status.

#### Infection Control Functions.

Infection control BFFs are actions performed to prevent and control infections associated with (a) battle injuries and (b) disease and nonbattle injuries (DNBI) in a field environment. These actions require nursing personnel to apply infection control principles to the practice of nursing in a field environment for the purpose of minimizing infection and its associated disability, morbidity, and mortality. An example of an infection control BFF is to *Manage field waste*.

#### Sustainment Functions.

Sustainment BFFs are actions performed in support of patients, oneself, or other staff to ensure ongoing patient care services in a field environment, to include patient care in aid stations, medical companies, dispensaries, clinics, and hospitals in all levels of care. These actions require nursing personnel to apply sustainment principles to their work in a field environment. An example of a sustainment BFF is to *Develop staffing and patient flow plans for a mass casualty situation*.

## **Scope**

The RTP is limited in scope to individual training designed to prepare nursing personnel for tasks that are critical to their patient care roles in a deployed or field status, but are not routinely performed in the same manner in fixed MTFs. That is, the RTP does not focus on training clinical skills commonly performed by nursing personnel in fixed healthcare facilities. Many skills are commonly performed in the same or a similar manner in both fixed facilities and the field environment. Nursing personnel can sustain their basic competencies in these skills when providing patient care in fixed facilities.

Trainers should take particular notice of this first limitation in the scope of the RTP. It is expected that personnel who have had minimal or no experience in patient care roles in fixed facilities will need more intensive training in both clinical skills and BFFs than is planned for the general training program. Leaders and trainers must take the background of their personnel into account when planning their training and allow for adequate training resources to meet the individual needs of their nursing personnel.

Other limitations in the scope of the RTP are that it does not address clinical skills related to treatment of nuclear-biological-chemical casualties and it does not address soldier skills. Also, the RTP does not address specialized individual training (a) for psychiatric nurses in their field role on combat stress control teams or (b) for community health nurses in their preventive medicine role in the field environment. Finally, the RTP does not address tasks related to patient documentation. At the time the RTP was being developed, there were no approved standard patient documentation forms for use in the field environment.

## **Responsibilities**

It is the joint responsibility of the Chief Nurse, US Army Forces Command (FORSCOM), and Chief, Department of Nursing Science, Academy of Health Sciences, AMEDDC&S to institutionalize the RTP throughout the AMEDD. Other individuals in the AMEDD share the responsibilities for overseeing and implementing the RTP.

### Overseeing Training

The following individuals in the active and reserve components of the AMEDD are responsible for overseeing implementation of the RTP in their areas of command:

- Division surgeons.
- Group chief nurses and commanders.
- Brigade chief nurses and commanders.
- Corps surgeons.
- TDA and TOE hospital chief nurses and commanders.
- PROFIS hospital chief nurses and commanders.
- HSSA chief nurses and commanders.
- Designated officer at each HSSA.

These individuals have key roles in ensuring that all nursing personnel in the active and reserve components of the AMEDD are prepared to provide care in a deployed or field status. They must ensure the support of those directly responsible for approving training time for nursing personnel in their command.

#### Implementing Training

The RTP is designed for use with nursing personnel in several AOCs/MOSs in different training environments. The following individuals in both TOE and TDA organizations are responsible for implementing the RTP in their respective environments:

- Squad and platoon leaders.
- Section sergeants and wardmasters.
- Officer section leaders.
- FORSCOM nurses.
- TOE hospital chief nurses.
- Brigade and battalion surgeons.
- PTM&S and NESD personnel with assistance from PROFIS personnel.
- AMEDDC&S personnel conducting field training.
- Clinical trainers in non-hospital medical units.

It ultimately is the responsibility of nursing personnel themselves to use the RTP for identifying clinical skills and knowledge areas in which they need training and to train to standard.

#### **Training Principles**

The following principles are critical to the success of the Readiness Training Program (RTP):

- Make Leaders Responsible for Training.
- Train the Trainers.
- Use Appropriate Publications for Training.
- Use Performance-Oriented Training.
- Train using Realistic Field Conditions.
- Maintain Mission-Essential Equipment and Supplies.
- Train to Challenge.
- Train to Sustain Proficiency.

These principles are emphasized in current Army training publications (see FM 25-100 & FM 25-101). Moreover, their importance in effective readiness training for nursing personnel has been demonstrated in the readiness studies on which this TSP is based. Application of these principles to the RTP will be briefly discussed.

### Make Leaders Responsible for Training

The success of a unit's training program for nursing personnel depends on competent, dedicated leaders who are personally involved in ensuring that the program has adequate training resources. Training resources include "those human, physical, financial, and time resources used to conduct and support training" (TRADOC Reg 350-70, p. Glossary-30). Leaders must take the required actions to ensure that time is protected for training and that the materials, personnel, equipment, and facilities required for training are made available. Training distractors cannot be allowed to prevent personnel from participating in training.

Moreover, leaders create the training climate for their unit. They must require their trainers to perform their roles to standards of excellence. Also, they must obtain feedback from their trainers on the progress of the training. Effective lines of communication between leaders and trainers will allow leaders to participate in the continuous evaluation of training.

### Train the Trainers

One of the most important actions that unit leaders can take to ensure the success of their training program is to select a core group of competent trainers who are committed to training individuals in their unit. These trainers must understand the objectives of the unit's training program and must have experience in the clinical skills and BFFs being trained. This core group of one or more trainers can train other trainers as needed for the unit's training program.

Before executing the training, each trainer must be able to master the clinical skills and BFFs that he is training. Trainers should be subject matter experts (SMEs) in their assigned tasks. That is, trainers should have a thorough knowledge of the tasks they are training. They should know the tasks well enough to answer soldiers' questions. Furthermore, trainers must receive instruction in the type of training being conducted--such as performance-oriented training for clinical skills. Finally, trainers must rehearse the training as they plan to present it and obtain feedback on their rehearsals from experienced trainers.

### Use Appropriate Publications

Training must be consistent with information in Army publications. Trainers should consult doctrinal manuals and other Army publications that provide principles, procedures, and critical information needed to train clinical skills and functions. Refer to the Glossary (Appendix E) for definitions of these types of publications, which include the following:

- Army Regulations (ARs).
- Field Manuals (FMs).
- Military Qualification Standards (MQS) Manuals.
- Mission Training Plans (MTPs).
- Soldier Training Publications (STPs).
- Soldier's Manuals (SMs).
- Technical Bulletins (TBs).

- Technical Manuals (TMs).
- Training Circulars (TCs).

The field medical equipment general support maintenance manuals (TMs) written by the US Army Medical Matériel Agency (USAMMA) are excellent resources for training. These TMs provide information needed to understand equipment capabilities, functions, and characteristics and to set up, operate, test, and repair the equipment. Contact your unit medical maintenance personnel and/or USAMMA for assistance in obtaining copies of these TMs.

When Army publications do not contain information about tasks that need to be trained, trainers should use other materials--such as operating manuals for field medical equipment and healthcare literature--together with their own experiences to develop new training materials. Furthermore, trainers should use evaluations of their training to continuously improve their training materials. Trainers are requested to submit revised and new training materials through appropriate channels for inclusion in future editions of this TSP (see Appendix D).

#### Use Performance-Oriented Training

Performance-oriented training should be used for training all clinical skills and should be used as much as possible for training BFFs. Performance-oriented training refers to "training in which learning is accomplished through performance or the actual doing of the tasks or supporting learning objectives under specific conditions until an established standard is met" (TRADOC Reg 350-70, p. Glossary-21). Performance-oriented training stresses the importance of training soldiers to standard, not to time. Some personnel will require more time than others to train to standard on any given task. The training schedule must be flexible enough to accommodate individual training needs.

Nursing personnel who are being trained on skills and functions required to provide patient care in the field must understand the tasks on which they are being trained to standard and the task conditions. The same standards must be enforced for a task regardless of the AOC/MOS of personnel being trained. As performance levels improve, conditions under which tasks are performed can be made more demanding, but the standards should remain constant.

#### Train Using Realistic Field Conditions

Routine training conducted with nursing personnel must replicate conditions they will encounter when providing patient care in a deployed or field status. Those who have experience providing patient care in a field environment should develop realistic scenarios to use during training situations. In the absence of actual patient care situations, nursing personnel must train with realistic training aids, such as mannequins, and with the actual equipment and supplies they would use in a deployed or field status. Moreover, they must train under these conditions on tasks they would be expected to perform in a field environment.

### Maintain Mission-Essential Equipment and Supplies

To conduct realistic training, nursing personnel must have access to mission-capable field medical equipment, equipment parts, and expendable supplies they would use in a deployed or field status. Moreover, all equipment must be maintained in an operational state of readiness for use in patient-care situations consistent with the current mission of the unit. Thus, responsible equipment operators and maintenance personnel must perform regular preventive maintenance checks and services (PMCS).

Ideally, all equipment and supplies required for training should be easily accessible to nursing personnel at the unit level. This may not always be the case, especially for some units in the reserve components (RC) of the AMEDD. In these instances, the unit should consider conducting training for nursing personnel at their Regional Training Site-Medical (RTS-MED) facility. For example, training as outlined in this TSP has been successfully conducted with nursing personnel in several reserve units at the Fort Indiantown Gap RTS-MED during inactive duty training (IDT) and annual training (AT) time.

### Train to Challenge

Leaders must ensure that training in clinical skills and functions is mentally challenging and as close to field conditions as possible. Nursing personnel who have received training in the RTP have been excited and motivated to learn when presented with challenging, realistic training on patient care skills and functions they would be expected to perform in a field environment. As nursing personnel undergo this type of challenging training, confidence in their own ability to provide patient care in a field environment improves along with their demonstrated proficiencies in the skills and functions being trained.

### Train to Sustain Proficiency

Once nursing personnel have mastered a group of tasks identified as critical to the unit's mission, a method of sustaining their task proficiencies needs to be incorporated into the unit training plan. Refresher or sustainment training is "used to reinforce previous training and/or sustain/regain previously acquired skills and knowledge. The training is related to course-specific training objectives, performed under prescribed conditions, and must meet prescribed performance standards" (TRADOC Reg 350-70, p. Glossary-23).

Nursing personnel in a unit will fluctuate in their ability to perform critical skills and functions because of several factors, including training frequency, personnel turnover, new equipment fielding, and training resource constraints. Leaders should plan their yearly sustainment training so that the unit's level of proficiency in the selected skills and functions can be maintained in a band of excellence (FM 25-101). That is, training in critical skills and functions should be repeated at the minimum frequency necessary for sustainment, but frequently enough to prevent deep valleys in proficiencies.

Opportunity training, sometimes referred to as hip pocket training, can be used for sustainment training. It is training that is preselected, preplanned, and rehearsed, but is not conducted until unexpected training time becomes available (FM 25-101). For example, opportunity training can be conducted when there are slow times in field exercises or when scheduled training is completed early.

### **Training Management**

Training management is "the process commanders and their staff use to plan training and related resource requirements needed to conduct and evaluate training. It involves all echelons and applies to any unit in the Army regardless of strength, mission, organization, or equipment assigned" (TRADOC Reg 350-70, p. Glossary-30). Training management is a cycle which consists of the following four processes:

- Select Tasks for Training.
- Plan Training Based on an Assessment of Selected Tasks.
- Execute Training Using Methods Designed to Train to Standard.
- Assess Training Based on a Continuous Evaluation of Tasks.

The management of readiness training for nursing personnel should not be conducted in isolation from the rest of the unit's training. Instead, training conducted with nursing personnel on clinical skills and BFFs must be integrated with the entire unit's training management cycle. Detailed guidance on the four processes of selecting tasks for training and planning, executing, and assessing training can be found in FM 25-100 and FM 25-101. Following is a brief overview of these four processes of training management as applied to training clinical skills and BFFs.

#### Select Tasks for Training

Leaders must selectively identify and train tasks that accomplish the unit's critical missions. These tasks, which are based on the mission-essential task list (METL), focus the training plan for the entire unit and thus allow the unit's training requirements to be narrowed to an achievable number. When the supporting individual task list for each mission-essential task is being developed, leaders must ensure that clinical skills and BFFs which support performance of the unit's METL are selected as individual tasks for training.

Training materials (in the form of training objectives and task summaries) are presented in this TSP to help leaders select and train clinical skills and BFFs. These skills and functions have not been selected separately for different field environments. Furthermore, they do not need to be trained in any particular order.

Training materials are included in Chapter 2 for clinical skills that an expert panel of nurses selected as training priorities for nursing personnel in six different AOCs/MOSs. The expert panel for the readiness studies on which this TSP is based developed separate skill lists of training priorities for each AOC/MOS category (see Appendix A). Selection of the skills was based on

the extent to which personnel in each category perform the skill either frequently or as a life-saving measure in the field environment, but do not routinely perform the skill in fixed healthcare facilities. The readiness studies validated the need for training these clinical skills.

Training materials are included in Chapter 3 for BFFs. The core group of nurses who guided the readiness studies developed the BFF categories. The list of BFFs included in Chapter 3 were developed in consultation with subject matter experts on the readiness studies. A wide range of BFFs are included for nursing personnel in different training environments. Some BFFs are very broad-based; others refer to more specific actions performed by nursing personnel. The list of BFF training priorities has not been developed separately for each AOC/MOS.

Once leaders select their skills and functions for training, they can use the task summaries in Chapters 2 and 3 as needed. Leaders and trainers may decide to use several of the task summaries as they are written, revise some task summaries to meet their unit's needs, and/or develop new task summaries for clinical skills not addressed in this TSP. For example, a unit should train with equipment they will use in a deployed or field status. If a unit has something other than a Hewlett-Packard cardiac monitor, they should adapt the cardiac monitor task summary for use with the monitor they will use for patient care in a deployed or field status.

In addition to selecting skills and functions for training nursing personnel in the unit, leaders and trainers must determine which AOCs/MOSs to train on the selected skills and functions. When making this determination, they must keep in mind the basic premises and goals of the RTP. Resources must be maximized by focusing training for nursing personnel on clinical skills that personnel in their AOC/MOS perform frequently or perform as life-saving measures in a field environment, but do not routinely perform in fixed MTFs. Likewise, leaders must focus training for nursing personnel on BFFs that are critical to the support of patient care or unit management in a field environment, but are not routinely performed in the same manner in fixed MTFs.

#### Plan Training Based on an Assessment of Selected Tasks

A training plan includes "a detailed description of the actions, milestones, and resources required to implement a training strategy" (TRADOC Reg 350-70, p. Glossary-30). Army publications offer detailed guidance on developing and using long-range, short-range, and near-term training plans (see FM 25-100 and FM 25-101). Plans to train clinical skills and BFFs should be integrated with the unit's master training plan.

Assessment of a unit's strengths and weaknesses is the base upon which a training strategy is developed. The process of assessing training through measures such as firsthand observations and various training evaluations is continuous. However, formal assessment is conducted at the start of the planning process and after the execution of a major training program.

Formal assessment of the skill and knowledge levels of nursing personnel in tasks selected for training should consist of a performance test whenever possible. A performance checklist can be

used as a pretest for the clinical skills. A performance checklist is developed by breaking down a training objective into elements that must be correctly performed to determine whether an individual satisfactorily meets the performance standards (TRADOC Reg 350-70). The pretest for BFFs which cannot actually be performed in a unit's training environment can consist of a series of questions asking an individual to describe elements of the task performance.

Trainers should use the results of their initial formal assessment to refine their training plans. For example, nursing personnel demonstrating expertise on tasks during the pretest can be assigned to assist with training selected skills and functions as needed. Personnel demonstrating minor weaknesses on one or more tasks can be scheduled for quick refresher training on the tasks. Personnel who have no understanding of one or more tasks should be scheduled for training on the identified tasks when resources are available for more intensive training.

Training videotapes that demonstrate a pretest of the clinical skills described in Chapter 2 are available to help trainers prepare their own pretests (see Appendix C). Note that training objectives in the videotape manuals have been expanded for training purposes, and they appear as task summaries in Chapter 2 of this TSP in their expanded form. Field medical equipment and supplies needed to pretest and train these skills are described in Appendix B.

As previously stated, assessment is the base upon which a training strategy is developed. As defined in TRADOC Reg 350-70, a training strategy -

- Describes the methods and resources required to implement a training concept.
- Lays out the who, what, where, when, why, how, and cost of the training.
- Includes determining the training site and media selected to train each critical task.

More information on developing a training strategy can be obtained from Army publications such as FM 25-101. Important aspects of the training strategy for training clinical skills and functions include the following:

- Select testing and training sites and dates.
- Obtain required equipment and supplies.
- Select and train the trainers.
- Develop testing and training materials, including patient-care scenarios.
- Schedule personnel for testing and training.

Thorough preparation of the trainers for training is critical to the success of readiness training conducted in any unit. (See the previous discussion of *Train the Trainers* under the section on Training Principles.) As discussed in FM 25-101, leaders can use training rehearsals to -

- Identify weak points in the training plan.
- Ensure all safety and environmental considerations are met.
- Teach effective training techniques.

- Ask pertinent questions to determine if a trainer is proficient in the tasks being trained.
- Coach trainers until they feel confident in their ability to train.

#### Execute Training Using Methods Designed to Train to Standard

##### Clinical Skills.

Performance-oriented training has been successfully used to execute training on the clinical skills in Chapter 2. This training has included (a) presentation of explanatory information and principles underlying skill performance, (b) skill demonstration, and (c) practical exercise. Practical exercise, which is the hands-on application of the performance required to meet the training objective, is the focus of performance-oriented training (TRADOC Reg 350-70). When training to standard, it is critical that nursing personnel practice each skill until a trainer determines they have achieved mastery--i.e., they have performed the training objective within the prescribed conditions and to the stated standard. Additionally, nursing personnel would benefit from the opportunity to practice their newly-acquired skills during a patient play exercise. This type of training on clinical skills can be incorporated into a unit's training schedule at their duty station or at an RTS-MED facility.

As previously discussed, the task summaries for selected clinical skills in Chapter 2 should be adapted as needed to meet a unit's training needs. Practical exercise should focus on aspects of the skills that differ from the fixed facility to the field environment because of differences in equipment, supplies, availability of support services, and/or roles of nursing personnel. More information about the format and use of the task summaries for clinical skills is presented in Chapter 2.

##### Battle-Focused Functions.

As previously discussed, the task summaries for BFFs in Chapter 3 also should be adapted as needed to meet a unit's training needs. These task summaries are designed to be used in different training environments. For example, all or part of a task summary can be used in a professional development course for commissioned or noncommissioned officers. A subject matter expert should present the material in the task summary, but also should give nursing personnel the opportunity to discuss the material and apply their newly-acquired knowledge to realistic patient care scenarios developed for training.

Scenarios are the key to individualizing BFF training to meet the needs of a unit. Scenarios should be realistic situations that personnel are likely to encounter in their duty positions in a deployed or field status. The scenarios for BFFs are like the practical exercises for clinical skills. Learning occurs when nursing personnel use their critical thinking skills to apply their knowledge to realistic patient-care scenarios. More information about the format and use of the BFF task summaries is presented in Chapter 3.

### Assess Training Based on a Continuous Evaluation of Tasks

Periodic formal and informal after-action reviews (AARs) should be used to evaluate the training on a continuous basis throughout the training process. An AAR is "a professional discussion of an event, focused on performance standards, that enables soldiers to discover for themselves what happened, why it happened, and how to sustain strengths and improve on weaknesses" (TRADOC Reg 350-70, p. Glossary-5). The use of AARs throughout the training program allows leaders, trainers, and participants to reflect on what is happening during training, to make necessary changes in the training program as problems arise, and to refine the focus as needed for future training. Guidance on planning, preparing for, conducting, and following up AARs is available in Army publications such as FM 25-100, FM 25-101, and TC 25-20.

A formal assessment should be made of the skill and knowledge levels of nursing personnel after the tasks have been trained. Use of a posttest allows leaders to determine whether their personnel have been trained to standard on the selected tasks. The same planning considerations exist for both the pretest and posttest. For example, the posttest should consist of a performance test for the clinical skills that were trained. The posttest for BFFs which cannot actually be performed in a unit's training environment can consist of a series of questions asking an individual to describe elements of the task performance. Trainers may decide to use the same assessments for the pretest and posttest.

Unit leaders should submit formal reports of the status of training on clinical skills and functions to those responsible for overseeing the training of nursing personnel. The Unit Status Report is one tool that can be used for reporting this information in the Active Army, the Army National Guard, and the US Army Reserve. Designated MTOE and TDA units currently submit recurring Unit Status Reports in accordance with JCS Publication 1-03.3. These reports are designed to measure the status of a unit's resources and training by (a) comparing selected personnel, equipment, and training factors to wartime requirements and (b) obtaining the commander's overall assessment of his unit (AR 220-1). The Unit Status Report should include a summary of the number of nursing personnel in the unit who have been trained to standard on the clinical skills and functions selected for training.

### **Training Timeline**

Unit leaders and trainers should develop a timeline for selecting tasks for training and for planning, executing, and assessing their training. This timeline should not be made in isolation from the timeline for the rest of the unit's training, but should be integrated with the unit's master training timeline. Following is one example of a unit's timeline for training clinical skills and BFFs. Leaders and trainers should adjust the times and add more detail as needed to meet their unit's training needs.

### Oct-Nov

- Select tasks for training.
  - Review unit METL.
  - Select clinical skills.
  - Select BFFs.

### Dec-Feb

- Plan training.
  - Assess the unit's proficiency level in selected tasks.
  - Select testing and training sites and dates.
  - Obtain required equipment and supplies.
  - Select and train the trainers.
  - Develop testing and training materials, including scenarios.
  - Schedule personnel for testing and training.

### Mar-Jun

- Execute training on clinical skills.
  - Set up training sites.
  - Conduct final training rehearsal.
  - Present training.
    - Discuss underlying principles and explanatory information.
    - Demonstrate skills.
    - Conduct practical exercises (hands-on practice).
- Execute training on BFFs.
  - Set up training sites.
  - Conduct final training rehearsal with scenarios.
  - Present training.
    - Discuss subject matter and/or perform tasks.
    - Apply subject matter to scenarios.

### Jul-Sep

- Assess training.
  - Conduct posttests.
  - Conduct after-action reviews.
  - Prepare formal report of training assessment.
  - Submit recommended changes to the TSP through appropriate channels.
  - Plan for next year's training cycle.

### **Sustainment of the Training Support Package**

It is the responsibility of unit leaders to offer feedback regarding their experiences using this TSP. The procedure for submitting comments on the TSP is explained in Appendix D. Many types of comments are needed. For example, more information is needed regarding units' abilities to implement training using the training process outlined in the section on *Training Management*. What obstacles do units commonly encounter when implementing their training and what innovative methods do they use to overcome these obstacles?

Furthermore, it is recognized that the TSP must be continuously revised to stay current with the rapidly changing environment in which patient care must be provided in a field environment. As units implement and assess their training in this changing environment, ideas should emerge regarding needed changes in the content and format of the TSP. Also, it is expected that unit leaders and trainers will adapt the task summaries in Chapters 2 and 3 and write task summaries for other clinical skills and BFFs as needed to meet their unit's training needs. These new and revised task summaries should be shared with other units whose personnel would benefit from them as well.

Thus, it can be seen that unit leaders should submit their comments to those responsible for institutionalizing the TSP (see Appendix D). If units using the TSP share their training experiences and materials, this TSP can be continuously updated and used as a training resource to help nursing personnel in the AMEDD develop and sustain their readiness to provide patient care in a deployed or field status.

## CHAPTER 2

### TASK SUMMARIES FOR CLINICAL SKILLS

#### **Introduction**

#### Clinical Skills

In this chapter, task summaries are presented for clinical skills that have been identified as training priorities for nursing personnel in all levels of care in a field environment. Brief introductory points regarding use of these task summaries are presented here. Trainers should refer to Chapter 1 for further information regarding the use of these task summaries in implementing the Readiness Training Program (RTP) in their unit.

The task summaries for clinical skills are designed to help trainers meet the first goal of the RTP. This goal is to develop the competencies of nursing personnel in clinical skills they perform frequently or perform as life-saving measures in a field environment, but do not routinely perform in fixed healthcare facilities. These clinical skills can be categorized as follows:

- Equipment Skills -- performed using field medical equipment.
- Basic Skills -- performed without automated equipment or specialized support services.
- Expanded Role Skills -- performed in an expanded role in a field environment.

Recall that the RTP is aimed at providing training for nursing personnel who function in a deployed or field status in one of the following AOCs/MOSs in the active or reserve components of the AMEDD:

- Medical-Surgical Nurses (66H).
- Operating Room Nurses (66E).
- Nurse Anesthetists (66F).
- Medical Specialists (91B).
- Practical Nurses (91C).
- Operating Room Specialists (91D).

Note that "medical-surgical nurses" refers to all nurses who function in this AOC in a deployed or field status. Most personnel who work as community health nurses, obstetric-gynecologic nurses, pediatric nurses, and psychiatric nurses in fixed facilities function in a medical-surgical nursing role in a deployed or field status.

Most clinical skills included in this chapter can be placed in more than one of the three categories of clinical skills for each AOC/MOS. As presented here, clinical skills are listed under only one category, with all skills involving the use of field medical equipment listed under equipment skills. Listed after the title of each skill are the AOCs/MOSs of nursing personnel for whom each skill was selected as a priority for training.

A list of clinical skills for which task summaries have been developed for each AOC/MOS is included in Appendix A. An expert panel of nurses selected the list of clinical skills for each AOC/MOS category based on the extent to which personnel in each category perform the skill either frequently or as a life-saving measure in the field environment, but do not routinely perform the skill in fixed healthcare facilities.

### Task Summaries

The task summaries for the clinical skills were developed from Army publications such as soldier's manuals, technical manuals, and field manuals as much as possible. Supplemental information was obtained for the summaries from other healthcare literature as needed. Furthermore, each summary has been reviewed by personnel proficient in the identified task. References are listed with each clinical skill so that trainers can consult them as needed for further information needed for training.

The task summaries for clinical skills consist of a task title, conditions, standards, performance measures, and references. Note that the training objectives for clinical skills can be found within the task summaries. A training objective consists of the task title, conditions, and standards listed at the beginning of each task summary. General definitions of major components of task summaries can be found in the Glossary (see Appendix E). Brief explanations of the task summary components for clinical skills are as follows:

- Task Title. Performance under consideration.
- Conditions. Circumstances under which a task is performed, including equipment and supplies provided.
- Standards. How well or at what level a task must be performed.
- Training Objective. A statement that describes the desired outcome of a training activity in the unit. It consists of the following three parts: Task title, conditions, and standards.
- Performance Measures. What must be done to perform the task successfully.
- Notes. Explanatory information supporting task performance.
- Warnings. Possible personnel injury or equipment damage.
- References. Sources that provide more detailed information about the task.

The following additional material is presented for each task summary in this chapter:

- Introduction. Explanatory information about the skill, including principles underlying skill performance.
- Written Exercises. Questions that focus on practical information about the clinical skill being trained. To answer these questions, students must recall and/or apply information in the task summaries.

As previously discussed, trainers should individualize their training based on the current mission of their unit and needs of their nursing personnel. After reviewing their unit METL, trainers may decide to use one or more of the following task summaries as they are written, revise some summaries to meet their unit's needs, and/or develop new summaries for other clinical skills. Trainers must remember that these task summaries are designed to assist them in their training. The task summaries should not be used to replace hands-on practice of the clinical skills under supervision of a trainer.

#### Training Methods

Training methods are the procedures or processes used to attain the training objectives (TRADOC Reg 350-70). Army training publications can be consulted for guidance regarding use of various training methods (e.g., see FM 25-100 and FM 25-101). Following is one method that has been successfully used to train clinical skills in a structured performance-oriented training program:

- Each student is given his own study guide, which contains task summaries for clinical skills that are to be trained.
- Trainers demonstrate a skill and present practical explanatory information and principles underlying the skill to a large group of students. Each large group consists of 10 to 15 students.
- Students break into small groups to engage in hands-on practice of the skill under supervision of a trainer. Hands-on practice of the skill in the small group setting simulates actual patient care practice to the greatest extent possible. Each small group is made up of one trainer and 3 to 5 students.
- Each student continues to practice all steps of the skill (as outlined in performance measures of the task summary) until the trainer has determined that the student can perform the skill to standard. After a student completes his hands-on practice, he answers the written exercises in his study guide.
- All students come back together in the large group. In this group, trainers discuss the practical and written exercises with the students and answer any final questions regarding performance

of the skill. Then the cycle begins again with another skill being demonstrated for the large group of students.

This training method is particularly advantageous when a unit has a small core group of one or more experienced "senior" trainers who are excellent subject matter experts and several other less-experienced "junior" trainers. The senior trainers can oversee the presentation of material in the large group and can be available to assist junior trainers in their small groups as needed.

### Training Resources

As will be discussed, trainers need to develop their own scenarios for use with the triage task summary, and they may find scenarios useful for training other clinical skills. Resources for the development of scenarios include the *Treatment Briefs* in the 1994 draft of the *DEPMEDS Administrative Procedures and Clinical and Support Guidelines*. Contact the Chief Nurse, FORSCOM or the Chief, Department of Nursing Science, AMEDDC&S for information about obtaining a copy of this document on disk (see Appendix D).

Furthermore, Mission Training Plans (MTPs) include scenarios that can be adapted for use as needed for training. Army Training and Evaluation Program (ARTEP) Publications include--but are not limited to--MTPs for various types of medical companies as well as the Combat Support Hospital (CSH), Field Hospital (FH), and General Hospital (GH). Contact the ARTEP Section of the Department of Training Development, AMEDDC&S for information about obtaining a copy of one or more MTPs on disk. You can contact the ARTEP Section at COM (210) 221-2672 or DSN 471-2672/1291 or at the following address:

Department of Training Development  
ATTN: MCCS HTU  
CMDT AHS  
1750 Greeley Road  
Fort Sam Houston, TX 78234-6122

**Note.** Both the content and format of the following task summaries have evolved over time as a result of the writing, reviews, and recommendations of expert panel members from the readiness studies and other subject matter experts as well as lessons learned from use of the task summaries with units in the active and reserve components of the AMEDD. As has been recommended, material from selected FMs and other government documents are reproduced here for use in training.

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## A. Skills Performed Using Field Medical Equipment

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### 1.01: Operate a Cardiac Monitor-Recorder (66H, 66E, 66F, 91B, 91C)

#### Introduction:

This task summary describes operation of the Hewlett Packard cardiac monitor-recorder (NSN 6515-01-291-1198 (monitor-recorder with cover) or NSN 6515-01-291-1199 (monitor-recorder module, defibrillator module, and combining case)), which is a bedside cardiac monitor designed to monitor the electrocardiogram (EKG) of patients in, or in danger of entering, cardiac crisis.

The monitor controls contain the switches and indicators that control module power, EKG source, beeper volume, EKG size, alarm settings, and battery status. The 5-inch CRT monitor screen displays the EKG waveform. The EKG display is in a moving erase-bar mode, which allows the operator to view 4 seconds of EKG waveform information in a stationary presentation on the screen until it is replaced by new information. The monitor screen also displays the heart rate, EKG source, and alarm limits.

The recorder controls contain the switches and indicators necessary to activate/deactivate the diagnostic stripchart recorder. The stripchart recorder provides a hard copy of the EKG waveform and other information printed along the edge.

When the power is turned on, the instrument powers up in the paddles mode (for the defibrillator module), with EKG size to auto and heart rate alarms set off but preset to 40 and 140 beats per minute (bpm). EKG size, QRS beeper volume, and high and low heart rate alarm limits are adjustable.

#### Task Summary:

##### Conditions

A patient in your field MTF needs an EKG tracing. You have identified the patient, explained the procedure to him, and washed your hands. You have the following equipment and supplies: Field table; Hewlett-Packard cardiac monitor-recorder (NSN 6515-01-291-1198 or 6515-01-291-1199), 5-lead electrode set, 4 metal plate limb electrodes with holding straps; 1 suction cup electrode; 1 tube of electrode gel; 1 roll of recorder paper; 1 box of alcohol pads; 1 mannequin (with 4 extremities) on a hospital bed.

### Standards

Set up a cardiac monitor-recorder, connect a patient (mannequin) to the machine, and obtain an EKG tracing IAW the references.

### Performance Measures

Go    No Go

1. Ask or assist the patient to lie supine on the bed.    \_\_\_\_\_
2. Make sure that the patient's body is not in contact with metal objects and that all limbs are firmly supported.    \_\_\_\_\_

**Note.** Some metal objects, watches, or jewelry may interfere with the accurate recording of the electrical impulse.

3. Instruct the patient to relax and breathe normally throughout the entire procedure.    \_\_\_\_\_
4. Turn the machine on and connect the 5-lead electrode set as follows:
  - a. Push POWER ON key to turn monitor-recorder module on.    \_\_\_\_\_

**Note.** When the monitor-recorder module is turned on, all LED indicators will light and a tone will sound for approximately one second. If the AC power cord is connected to an AC source, the module will operate on AC. If the AC power cord is not connected, the module will operate on the internal battery.

- b. Connect 5-lead electrode set to six-pin female connector on monitor-recorder module.    \_\_\_\_\_

**Note.** The monitor-recorder can be used with an electrical source or with the internal battery. Battery charge time is 2 hours for 90% capacity. Battery capacity is 4 hours monitoring or 1 hour recording. LOW BATTERY is displayed in the lower left hand corner of the CRT screen when the battery is in need of recharging. When this message first appears there is a minimum of 30 minutes monitoring time available.

5. Select Lead II for monitoring the patient as follows:
  - a. Press LEAD SELECT key to sequentially change EKG source between leads I, II, III, aVR, aVL, aVF, and V.    \_\_\_\_\_
  - b. Look at CRT screen to check that Lead II is selected.    \_\_\_\_\_
6. Activate high and low alarms by pressing ALARMS ON/OFF key to activate heart rate alarms.    \_\_\_\_\_

**Note.** The red ALARMS OFF LED is on when heart rate alarms are deactivated and off when alarms are activated.

Performance Measures	Go	No Go
7. Place high and low alarms at desired settings as follows:		
a. Use SELECT key to select HI ALARM limit indicator. Press up/down arrow keys to adjust high alarm limit.	—	—
b. Use SELECT key to select LO ALARM limit indicator. Press up/down arrow keys to adjust low alarm limit.	—	—
<b>Note.</b> When the power is turned on, the heart rate alarms are set off but are preset to 40 and 140 beats per minute (bpm).		
8. Apply limb electrodes as follows:		
a. Clean sites for electrode placement by wiping areas with alcohol to remove dead skin and oils.	—	—
b. Apply small amount of electrode gel to sites.	—	—
c. Position limb electrodes and secure with holding straps as follows:		
(1) Secure leg electrodes on medial or lateral aspect of calf.	—	—
(2) Secure arm electrodes on inner aspect of arm or forearm, ensuring that connections are not on or immediately adjacent to an IV site.	—	—
(3) Make connections over a fleshy area, not over bone, as bone may interfere with conduction of the electrical impulse to the electrode.	—	—
d. Make sure that limb electrodes are correctly attached to the 5-lead electrode set.	—	—
<b>Note.</b> Make the usual electrode connection to a fleshy part of the stump if the patient is missing a limb. Secure the electrode with tape if necessary.		
9. Push the Run/Stop button for 6 seconds while in Lead II to obtain an EKG tracing.	—	—
10. Prepare the report as follows:		
a. Remove EKG tracing from recorder.	—	—
b. Mark EKG tracing printout with patient's identification, date, time, and your initials.	—	—

Performance Measures	Go	No Go
11. Remove electrodes from patient and clean gel from skin with a damp towel or continue to monitor the patient in Lead II.	—	—
12. Press the POWER OFF/RECHARGE key to turn the monitor-recorder module off.	—	—
<b>Note.</b> If the AC power cord is connected to an AC source, the BATT CHRG indicator will illuminate when the module is turned off and the internal battery will charge.		
<b>Note.</b> The exterior surfaces of the Hewlett-Packard cardiac monitor-recorder can be cleaned with alcohol, soap and water, chlorine bleach (30 ml bleach per 1 liter water), or ammonia-based household cleaners. Do not allow fluids to penetrate the instrument case.		
<b>OVERALL EVALUATION</b>		

**Written Exercises:**

1. How does the Hewlett-Packard cardiac monitor-recorder differ from cardiac monitors commonly found in fixed facilities?
2. When using the internal battery, how many hours of continuous monitoring can a fully-charged Hewlett-Packard cardiac monitor provide?
3. When the "LOW BATTERY" message is displayed on the screen of the Hewlett-Packard cardiac monitor-recorder, how many minutes of monitoring time remain?
4. List 4 cleaning solutions that are acceptable for cleaning the exterior surfaces of the Hewlett-Packard cardiac monitor-recorder and its accessories.

**References**

- Hewlett-Packard. (1989). Hewlett Packard 43110MC defibrillator/monitor-recorder operating guide. McMinnville, OR: Author.
- HQDA. (1990). Soldier's manual and trainer's guide: MOS 91C practical nurse, skill levels 2/3/4/5 (STP 8-91C25-SM-TG: Task 081-835-3007). Washington, DC: Author.

## **1.02: Obtain a 12-Lead EKG (66H, 91B, 91C)**

### **Introduction:**

This task summary describes how to obtain a 12-lead electrocardiogram (EKG) using the Hewlett Packard monitor-recorder. (See Task 1.01 for more information regarding operation of this cardiac monitor-recorder.) A 5-lead cable and a Lead Select key on the module allow recording of a complete 12-lead EKG.

### **Task Summary:**

#### **Conditions**

The 4 limb electrodes of a Hewlett-Packard cardiac monitor-recorder are attached to a patient (mannequin), and you have just obtained an EKG tracing. You have been asked to obtain a 12-lead EKG on the patient. You have the following equipment and supplies: Field table; Hewlett-Packard cardiac monitor-recorder connected to an electrical source; 5-lead electrode set connected to monitor; 4 metal plate limb electrodes attached to patient with holding straps, 1 suction cup electrode, 1 tube of electrode gel, 1 roll of recorder paper, 1 box of alcohol pads; 1 mannequin (with 4 extremities) on a hospital bed.

#### **Standards**

Obtain a 12-lead EKG using appropriate procedure IAW the references.

<b>Performance Measures</b>	<b>Go</b>	<b>No Go</b>
1. Check positioning of 4 limb electrodes (See Task 1.01: Operate a Cardiac Monitor-Recorder).	—	—
2. Use Lead Select switch to change EKG source between Leads I, II, III, aVR, aVL, and aVF and run a 6 second strip in each position.	—	—
3. Place Lead Select switch in Lead V.	—	—
4. Connect suction cup electrode to chest lead.	—	—
5. Select the following sites for placement of the chest electrode: a. V1: 4th ICS at Right sternal border (RSB). b. V2: 4th ICS at Left sternal border (LSB). c. V3: Halfway between V2 & V4. d. V4: 5th ICS at Left midclavicular line.	— — — —	— — — —

Performance Measures	Go	No Go
e. V5: 5th ICS at Left anterior axillary line.	—	—
f. V6: 5th ICS at Left midaxillary line.	—	—
<b>Note.</b> The standard EKG machine utilizes 12 "leads." These leads represent paths of electrical activity, and they are designated as Leads I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, and V6. Do not confuse these 12 leads with the 10 electrodes, which are sometimes referred to as "leads"--i.e., 4 limb "leads" and 6 chest "leads" (V1-V6) attached to the patient.		
6. Prepare sites for chest electrode placement as follows:		
a. If necessary, shave hair from application site to ensure good electrode to skin contact.	—	—
<b>Note.</b> Proper application and placement of electrodes is essential for quality EKG monitoring. Good contact between the electrode and skin minimizes the effects of motion artifact and signal interference.		
b. Clean sites with soap and water or alcohol and wipe dry. This will remove dead skin and oils.	—	—
c. Apply a small amount of electrode gel to sites.	—	—
7. While limb electrodes are in place and the Lead Select switch is in Lead V, run a 6 second EKG strip with chest electrode in each of the sites that have been prepared for V1-V6.	—	—
8. Prepare report as follows:		
a. Remove EKG tracing from recorder.	—	—
b. Mark EKG tracing printout with patient's identification, date, time, and your initials	—	—
c. Label each section of EKG tracing with correct V lead label.	—	—
9. Remove chest electrode and 4 limb electrodes.	—	—
10. Wipe patient's skin with a damp towel to remove electrode gel.	—	—
<b>Note.</b> LEAD I, II, III, aVR, aVL, aVF, or V (as selected by the Lead Select key) is automatically printed every 10 seconds when using the electrode lead set as the EKG source. The operator must label V1-V6 on appropriate sections of the EKG tracing.		
11. Press the POWER OFF/RECHARGE key to turn the monitor-recorder module off.	—	—

Performance Measures	Go	No Go
12. Wash metal plate limb electrodes and holding straps with soap and water and rinse. After drying electrodes, store them with the monitor-recorder.	—	—
<b>OVERALL EVALUATION</b>	—	—

**Written Exercises:**

1. Describe the preparation of sites for chest electrode placement. Why is this preparation necessary?
2. Describe the placement of the chest electrode for leads V1-V6 when obtaining a 12-lead EKG.
3. Which sections of the EKG tracing must the operator label because they are not automatically labeled by the monitor-recorder?

**References**

Hewlett-Packard. (1989). Hewlett Packard 43110MC defibrillator/monitor-recorder operating guide. McMinnville, OR: Author.

HQDA. (1990). Soldier's manual and trainer's guide: MOS 91C practical nurse, skill levels 2/3/4/5 (STP 8-91C25-SM-TG: Task 081-835-3007). Washington, DC: Author.

## **1.03: Operate a Field Portable Oropharyngeal Suction Apparatus (66H, 66F, 91B, 91C)**

### **Introduction:**

This task summary describes operation of the Impact Model 308M oropharyngeal suction apparatus (NSN 6515-01-304-6497), which is a self-contained, general-purpose, suction apparatus designed for removing secretions from the upper airway during oropharyngeal and/or tracheal suctioning procedures (TM 8-6515-004-24&P).

The suction apparatus consists of a low volume, low vacuum pump; an aspirate collection canister; a valve to control the deliverable vacuum level; and a gauge. The valved, diaphragm-type pump creates a vacuum in the collection canister. The rotary knob on the vacuum control valve allows selection of a vacuum level for the patient. The pump expels pressurized air through its exhaust valve and port.

The suction apparatus is used with a patient suction tube and suction catheter to aspirate material from the patient into the collection canister. The liquid in the collection canister must not be allowed to overflow back into the suction apparatus.

The suction apparatus is a transportable device designed to operate within a field medical treatment facility, within an ambulance or other evacuation vehicle, and with a litter. The operating mode selector switch permits multiple sources of electrical power and recharging of the internal battery pack. When operated in a wet environment, the suction apparatus should be covered with a protective barrier (plastic sheet, tarpaulin, etc.).

### **Task Summary:**

#### **Conditions**

You are providing patient care in a field environment and need to suction oropharyngeal secretions from a patient. You have the following equipment and supplies: Field table; 1 field portable oropharyngeal suction apparatus (NSN 6515-01-304-6497); sterile patient suction tubing and suction catheter; 1 small container of water; 1 pair of clean gloves.

#### **Standards**

Operate a field portable oropharyngeal suction apparatus to perform a clean procedure IAW the references.

Performance Measures	Go	No Go
1. Select one of the following locations for use of suction apparatus and modes of electrical operation:	—	—
• Field medical treatment facility area or ward - AC power source.	—	—
• Ambulance or other evacuation vehicle - DC (12V) power source.	—	—
• Litter - internal battery pack.	—	—
<b>Warning.</b> Do not block or occlude the exhaust port of the vacuum pump to prevent incorrect operation of the suction apparatus.		
<b>Note.</b> The suction apparatus will operate on internal battery pack for 20 minutes when using maximum vacuum. The Charge indicator illuminates when connected to 115 volts alternating current (VAC). The internal battery pack takes approximately 16 hours to recharge from a completely discharged condition.		
2. Mount suction apparatus securely (if using it with a patient on a litter) as follows:		
a. Locate 2 black webbed nylon straps with hook-and-loop fasteners on each end.	—	—
b. Position suction apparatus and patient onto litter.	—	—
c. Thread straps through D-ring fasteners located near lower front and back of case and secure suction apparatus to the litter.	—	—
3. While operating mode selector switch is in Off/Charge position, connect power cable or vehicle power cord to appropriate source of electrical power.	—	—
4. Attach short connecting tubing from vacuum pump to collection canister.	—	—
<b>Note.</b> An optional filter which is both hydrophobic and bacterial can be connected between the vacuum pump and the collection canister furthest from the patient. This filter should be replaced (a) when discoloration of its membrane occurs, (b) when the membrane comes in contact with aspirate, or (c) following 150 hours of use. This filter is designed to retain bacteria which would otherwise be exhausted into the immediate vicinity.		
5. Verify that all tubing connections are tight and that the black collection canister end caps are firmly in place. No kinks should be in connecting tubing.	—	—
<b>Note.</b> Multiple collection canisters can be connected together in a series if a large quantity of aspirate is anticipated. A standard hospital style collection canister should be considered for use if the suction apparatus is used on a "crash cart." This will give a greater collection capacity and will provide a means of indicating aspirate volume.		

Performance Measures	Go	No Go
6. Turn operating mode selector switch to either AC, 12V DC, or Battery position as required.	—	—
<b>Note.</b> The vacuum pump will start operating and the green POWER indicator will illuminate.		
7. Pinch and hold the clear, plastic tubing connected to the collection canister and then rotate the VACUUM ADJUST control knob to the desired maximum deliverable vacuum level. Release tubing.	—	—
<b>Note.</b> Deliverable vacuum will not exceed preset level. If suction is too low, secretions cannot be removed. If suction is too high, mucous membranes may be forcefully pulled into catheter opening.		
<b>Warning.</b> Rotating the VACUUM ADJUST control knob without pinching tubing connected to the collection canister will change the maximum deliverable vacuum level to an unknown setting.		
8. Connect patient suction tubing to the collection canister.	—	—
9. Open suction catheter package to expose suction port of catheter.	—	—
10. Put on clean gloves.	—	—
11. Remove suction catheter from package and connect catheter to suction tubing.	—	—
12. Test patency of catheter as follows:		
a. Insert catheter tip into container of clean water.	—	—
b. Place thumb over suction port to create suction until water can be seen entering the collection canister.	—	—
c. During operation of the suction apparatus, periodically observe the vacuum gauge setting and the collection canister for potential overflow.	—	—
<b>Note.</b> A rinse bottle is included with the Model 308M. It is designed for use during a clean procedure to hold a water/saline solution to flush the suction tubing and catheter, which may become clogged with aspirate.		
<b>Warning.</b> Do not operate the suction apparatus with the lid of the case closed unless an optional overflow safety device is used. Do not use the suction apparatus for more than 27 minutes per hour regardless of its capability to operate continuously from external AC electrical power.		

Performance Measures	Go	No Go
13. Shut down the suction apparatus as follows:		
a. Rotate the VACUUM ADJUST control knob fully counterclockwise to decrease level of vacuum to "0."	—	—
b. Turn operating mode selector switch to the OFF/CHARGE position.	—	—
<b>Note.</b> The POWER indicator will extinguish and the CHARGE indicator will illuminate (providing the power cable is connected to a 115 volt receptacle).		
14. Change collection canister without spilling patient aspirate as follows:		
a. Disconnect tubing from both collection canister connectors.	—	—
b. Connect both collection canister connectors together with a small section of tubing to prevent spilling patient aspirate.	—	—
c. Dispose of aspirate IAW standard unit procedures.	—	—
d. Disassemble the collection canister by removing the two end caps.	—	—
e. Clean and disinfect the collection canister and end caps IAW standard unit procedures.	—	—
<b>Warning.</b> Disinfect the suction apparatus and collection canister with a liquid or spray disinfectant using standard unit procedures. Do <u>not</u> clean the collection canister cylinder with abrasive cleaning agents, alcohol, or chlorinated hydrocarbon agents. The collection canister can be sterilized with ethylene oxide only. Do <u>not</u> steam sterilize (autoclave) the collection canister. All tubing is disposable and is intended for one use.		
<b>Note.</b> Routine disinfection of the collection canister which does not involve removing aspirate can be accomplished using a spray disinfectant. Follow the routine start up procedures and while the vacuum pump is operating, spray a small amount of disinfectant directly into the collection canister.		
<b>OVERALL EVALUATION</b>	—	—

#### Written Exercises:

1. Describe 3 locations where you can use the field oropharyngeal suction apparatus while providing patient care and list the mode of electrical operation you would use for each location.

2. Describe 2 precautions that you must take when operating the field oropharyngeal suction apparatus.
3. When using the internal battery pack, the field oropharyngeal suction apparatus can provide suctioning at maximum vacuum for how many minutes?
4. Describe the procedure you would use to change the maximum deliverable vacuum level on the field oropharyngeal suction apparatus.
5. Describe how you would clean the field oropharyngeal suction apparatus (including the collection canister) IAW standard unit procedures. What cleaning solutions cannot be used with the collection canister?

#### References

- HQDA. (1993). Unit, direct support, and general support maintenance manual: Suction apparatus, oropharyngeal model 308M (TM 8-6515-004-24&P). Washington, DC: Author.
- Impact Instrumentation, Inc. (1992). Instruction manual operation & service: 308M series, oropharyngeal suction apparatus, portable, battery operated (Rev. E). West Caldwell, NJ: Author.

## **1.04: Operate a Surgical Suction Apparatus (66H, 66E, 91B, 91C)**

### **Introduction:**

This task summary describes operation of the Gomco Model 6053 surgical suction apparatus (NSN 6515-01-259-4307). The surgical suction apparatus is used to evacuate body fluids and/or air that can accumulate between the lung and chest wall (pleural space) following thoracic surgery or penetrating chest wounds or as a result of disease. The following introductory information is taken from TM 8-6515-009-24&P, which is a good resource for further information regarding use of the Gomco Model 6053 surgical suction apparatus.

The surgical suction apparatus is a self-contained high volume, low pressure unit with an integral mobile stand designed for use in a MTF. The motor-driven vacuum pump evacuates body fluids and/or air through tubing inserted surgically in the chest wall and connected to tubing that empties into a collection system.

The surgical suction apparatus operates from multiple voltages and frequencies. The integral stand has four non-marking casters. Two casters include brakes. A variable transformer controls the motor-driven vacuum pump to provide a vacuum range of 0 to 50 centimeters of water (cm H<sub>2</sub>O). The glass patient bottle and glass trap bottle are marked with graduations to 2800 milliliters. The drainage unit can operate continuously with its internal cooling fan.

Operation of the surgical suction apparatus is based on the water-seal principle. Patient fluids and/or air are drawn into the patient bottle, in which a water seal was formed by submerging the open ends of the tubes into 2 centimeters (cm) of sterile water in the bottom of the patient bottle. The water seal maintains the vacuum in the drainage unit and prevents any patient fluids and/or air from re-entering the pleural cavity if the unit loses electrical power or is accidentally turned off. A second bottle, referred to as a trap bottle and placed between the patient bottle and vacuum pump, protects the unit against the overflow of patient fluids.

### **Task Summary:**

#### **Conditions**

A chest tube has just been inserted in a patient in your field MTF. You must set up a surgical suction apparatus now and will need to change the patient collection bottle soon. You have the following equipment and supplies: A Gomco surgical suction apparatus (two-bottle water-seal system) with 3 drainage bottles (NSN 6515-01-259-4307); connecting tubing for suction apparatus; 2 rubber-padded large clamps; 1 bottle of sterile water.

### **Standards**

Set up the surgical suction apparatus (two-bottle water-seal system), adjust the vacuum, change the patient collection bottle, and perform emergency intervention IAW the references.

<b>Performance Measures</b>	<b>Go</b>	<b>No Go</b>
1. Assemble the surgical suction apparatus as follows:		
a. Assemble the patient bottle as follows:		
(1) Unscrew the cap assembly from the patient bottle and set the bottle aside.	—	—
(2) Install the two water seal tubes onto the cap assembly.	—	—
(3) Replace the cap assembly onto the patient bottle and place the patient bottle into its brackets on the right side of the base assembly.	—	—
b. Assemble the trap bottle as follows:		
(1) Unscrew the cap assembly from the trap bottle and set the bottle aside.	—	—
(2) Install the splash tube onto the cap assembly.	—	—
(3) Replace the cap assembly onto the trap bottle and place the trap bottle into its brackets on the left side of the base assembly.	—	—
c. Assemble the tubing as follows:		
(1) Connect the 'bottle to pump' tube from the trap bottle cap assembly to the vacuum pump swivel connector located on the underside of the control/pump module.	—	—
(2) Install the 'bottle to bottle' tube between the patient bottle swivel connector and the barb connector on the trap bottle.	—	—
(3) Connect each patient tube onto the patient bottle cap assembly.	—	—
<b>Note.</b> If only one patient tube is required, close the unused fitting on the patient bottle cap assembly with a patient tube cap.		
2. Perform the initial start-up procedures as follows:		
a. Roll the drainage unit to the area of use.	—	—
b. Ensure that the power switch is in the OFF position or depress the switch to its OFF position.	—	—

Performance Measures	Go	No Go
<b>Note.</b> The white rocker switch controls electrical power to the drainage unit. The built-in indicator illuminates in the ON position. The rocker switch is also used to supply electrical power to the night light to illuminate the patient drainage system during hours of darkness.		
c. Remove the coiled electrical power cable assembly from the cable clips mounted on the rear of the upright assembly.	—	—
d. Connect the electrical power cable assembly into a 115-volt electrical receptacle.	—	—
<b>Note.</b> Refer to TM 8-6515-009-24&P for voltage conversion procedures if only 230-volt electrical receptacles are available.		
e. Disconnect the patient tubes from the patient bottle cap assembly and then remove the cap assembly.	—	—
f. Pour sterile water into the patient bottle until it reaches the 2 cm mark on the graduated water-seal tubes or fill until tips of tubes are submerged.	—	—
g. Replace the patient bottle cap assembly and then reinstall the patient tubes.	—	—
h. Verify that the suction apparatus is properly assembled as previously described.	—	—
i. Turn the vacuum regulator knob to its maximum counterclockwise position.	—	—
j. Depress the power switch to the ON position.	—	—
k. Clamp the two patient tubes with the rubber-padded large clamps.	—	—
l. Rotate the vacuum regulator knob clockwise until the vacuum gauge indicates 20 cm H <sub>2</sub> O. (This setting will be the maximum vacuum.)	—	—
m. Reopen (unclamp) the patient tubes that are connected on one end to the patient collection bottle and connect them on the other end to the chest tubes.	—	—
3. Observe the patient bottle for bubbling and observe the patient tube for the flow of patient fluids.	—	—
4. Observe safety precautions when working with the surgical suction apparatus as follows:		
a. The bottles must be kept well-secured in an upright position and below the level of the chest.	—	—

Performance Measures	Go	No Go
b. Emergency equipment that should be available at the bedside includes the following:	—	—
(1) One bottle of sterile water.	—	—
(2) Two rubber-padded clamps.	—	—
(3) One package of sterile petroleum gauze.	—	—
(4) One commercial one-way flutter valve or materials for improvising a flutter valve.	—	—
5. Observe the dressing at the chest tube insertion site for air leakage and drainage.	—	—
6. Observe the drainage tubing for the following:		
a. Tubing should not be kinked or compressed by the bed or the patient's body.	—	—
b. Tubing should not loop below the level of the top of the bottles.	—	—
c. Drainage tubing connections should be taped for added security.	—	—
7. Observe chest drainage as follows:		
a. Note color and consistency.	—	—
b. Note amount of drainage and measure at prescribed time intervals.	—	—
(1) Mark level of drainage on tape affixed to patient bottle.	—	—
(2) Write date, time, and your initials at drainage level mark.	—	—
8. Perform emergency interventions for unintentional breaks in the water-seal system caused by the following actions:		
a. The chest tube is pulled out of the chest:		
(1) Cover insertion site with a sterile petroleum gauze square.	—	—
<b>Warning.</b> The chest tube insertion site must be covered immediately. Use your hand if no other material is available.		
(2) Notify charge nurse and/or physician immediately.	—	—
(3) Monitor patient for signs of respiratory distress.	—	—
b. The chest tube is disconnected from the system:		
(1) Immediately clamp the chest tube with the rubber-padded clamps.	—	—

Performance Measures	Go	No Go
(2) Depending on the situation, (a) cut off contaminated tips of chest tube and tubing, insert a sterile connector in chest tube and tubing, reattach to drainage system, and release clamp or (b) apply a flutter valve to end of chest tube and release clamp.	—	—
(3) Notify charge nurse and/or physician immediately and monitor patient for signs of respiratory distress.	—	—
9. Using aseptic technique, change the patient bottle as follows:		
a. Turn suction apparatus off and place 2 rubber-padded clamps securely on patient tubing close to patient, between patient and patient bottle.	—	—
b. Unscrew cap of patient bottle and remove bottle.	—	—
c. Place 2 cm sterile water in a new sterile patient bottle or fill until tip of graduated water-seal tubes are submerged.	—	—
d. Replace cap on new patient collection bottle, making sure that tubing connections and bottle caps are tight.	—	—
e. Remove clamps from patient tubing and turn suction apparatus on.	—	—
Note. The patient and trap bottles, cap assemblies, water-seal tubes, splash tube, and drainage unit connecting tubes can be cleaned with a nylon bristle brush in a warm detergent solution and sterilized in a steam sterilizer at 250°F for 15 minutes. Disinfect the drainage unit by wiping it with a liquid disinfectant or lightly spraying it with disinfectant IAW unit SOP.		
OVERALL EVALUATION	—	—

#### Written Exercises:

1. Describe the water-seal principle on which the Gomco surgical suction apparatus operates.
2. When setting up the Gomco surgical suction apparatus, sterile water should be placed in which bottle(s)? How much sterile water should be placed in the bottle(s)?

3. The chest tubes are connected to which of the bottle(s)?
  
  
  
  
  
  
4. What are you adjusting when you rotate the vacuum regulator knob, and what is a correct procedure for adjusting this?
  
  
  
  
  
  
5. What emergency equipment should be available at the bedside when operating the surgical suction apparatus with chest tubes?
  
  
  
  
  
  
6. Discuss emergency measures to take for possible unintentional breaks in the water-seal system.

#### References

- Allied Healthcare Products, Inc. (1989). Gomco model 6053 suction apparatus, surgical, high volume, low pressure, pleural cavity: Operation, maintenance and service manual. St. Louis, MO: Author.
- HQDA. (1990). Soldier's manual and trainer's guide: MOS 91C practical nurse, skill levels 2/3/4/5 (STP 8-91C25-SM-TG: Task 081-835-3031). Washington, DC: Author.
- HQDA. (1994). Unit, direct support, and general support maintenance manual: Drainage unit, pleural cavity, Model 6053 (TM 8-6515-009-24&P). Washington, DC: Author.
- Suddarth, D. S. (Ed.). (1991). Lippincott manual of nursing practice (5th ed.). Philadelphia: J. B. Lippincott.

## **1.05: Operate a Field Oxygen Delivery System (66H, 91B, 91C)**

### **Introduction:**

This task summary describes operation of a field oxygen delivery system using an "H" oxygen cylinder. Oxygen gas is stored under pressure in cylinders that are color coded green. Because oxygen cylinders are filled under a pressure of 2000 to 2200 pounds per square inch (psi), the cylinders must be handled in a safe manner. A pressure regulator is used to reduce the pressure for safe administration.

Regulators are attached to D and E oxygen cylinders by a yoke assembly with a Pin Index Safety System which requires that the yoke pins match the corresponding holes in the valve assembly for oxygen to be delivered. M, G, and H oxygen cylinders use a Diameter Index Safety System (DISS) and thus require a regulator that has a valve assembly with a threaded outlet specific to medical oxygen.

The flowmeter is used to control the amount of oxygen delivered to the patient. These devices are connected to the pressure regulator and adjusted to deliver oxygen in a certain number of liters per minute (L/min.). A humidifier may be attached to the flowmeter for the purpose of providing moisture to the dry oxygen coming from the cylinder.

The nasal cannula delivers low-concentration oxygen to patients by way of 2 small plastic prongs placed into the nostrils. It is difficult to obtain oxygen concentrations greater than 30% to 35% via nasal cannula. This is because mouth breathing decreases the concentration of inspired oxygen.

The face mask has small perforations that allow atmospheric gas to mix with oxygen during inhalation. These perforations also allow the patient's exhaled air to escape. Oxygen concentrations of 35% to 60% can be delivered through this device with a flow rate of 6 to 8 liters per minute (L/min.). Flow rates of less than 6 L/min. can produce an accumulation of carbon dioxide in the mask. Therefore, oxygen should be delivered through a face mask at a rate of at least 6 L/min.

### **Task Summary:**

#### **Conditions**

A patient in your field MTF needs to be placed on oxygen at 4 L/min. You have washed your hands. You have the following equipment and supplies: "H" oxygen cylinder in a secured position; cylinder regulator with flowmeter; Christmas tree adapter; wrench; nasal cannula with oxygen connecting tubing.

#### **Standards**

Assemble a field oxygen delivery system and demonstrate a method of delivering oxygen to a patient IAW the references.

Performance Measures	Go	No Go
1. Verify the cylinder's contents by reading its label and checking the color code (green for oxygen).	—	—
2. Secure cylinder in upright position (or IAW local SOP) with straps or in a stand.	—	—
3. Remove cylinder valve cap.	—	—
4. With the oxygen cylinder's outlet away from patients and yourself, use a wrench to "crack" (slowly open and quickly close) the oxygen cylinder for the purpose of flushing out any debris.	—	—
5. Attach cylinder regulator <u>after</u> cracking the cylinder as follows:		
a. Insert regulator inlet into the oxygen cylinder's threaded outlet while holding gauge in an upright position.	—	—
b. Hand-tighten inlet nut located on the cylinder regulator and then completely tighten with a wrench.	—	—
c. Open valve to test for leaks and then close it.	—	—
<b>Note.</b> If there is a leak, check the regulator connection and obtain a new regulator and/or cylinder if necessary.		
6. Attach oxygen administration device as follows:		
a. Attach Christmas tree adapter to cylinder regulator.	—	—
b. Attach end of nasal cannula oxygen connecting tube to adapter.	—	—
7. Set oxygen flow rate at 4 liters per minute.	—	—
8. Calculate oxygen cylinder duration of flow as follows:		
a. Determine remaining pressure in cylinder by reading regulator gauge.	—	—
b. Determine safe residual level of oxygen cylinder.	—	—
<b>Note.</b> The safe residual level is the level of gas at which the cylinder should be replaced. This level has been established as 200 pounds per square inch (psi).		
c. Determine available cylinder pressure by subtracting safe residual level from remaining pressure. (Example: 400 psi remaining pressure minus 200 psi safe residual level = 200 psi available pressure.)	—	—
d. Determine the conversion factor for the oxygen cylinder in use: D size gas cylinder is 0.16; E size is 0.28; G size is 2.41; H size is 3.14; M size is 1.56.	—	—

Performance Measures	Go	No Go
e. Determine the available liters by multiplying the conversion factor by the amount of available pressure. For example: An "H" size cylinder is being used. A 3.14 conversion factor x 200 psi available pressure = 628 liters of oxygen available for use.	—	—
f. Obtain the prescribed flow rate.	—	—
g. Determine the duration of gas flow by dividing the available liters by the flow rate. For example: 628 available liters divided by the prescribed flow rate of 10 L/min. = 62.8 minutes duration of gas flow.	—	—
9. Use safety procedures when setting up and administering the oxygen as follows:		
a. Keep combustible materials such as oil or grease away from the cylinders, regulators, fittings, valves, and hoses.	—	—
b. Close all valves when oxygen cylinders are not in use, even if they are empty.	—	—
c. Secure oxygen cylinders to prevent them from tipping over. In transit, keep them in an appropriate rack or carrier, or space permitting, strap them onto the litter with the patient.	—	—
d. When working with an oxygen cylinder, always remain to one side. Never place any part of your body over the cylinder valves. A defective cylinder can launch a loosely fitting regulator with enough force to severely injure anyone in its path.	—	—
e. Do not smoke in any area where oxygen cylinders are in use or are being stored.	—	—
f. Do not subject the oxygen cylinders to temperatures above 120°F.	—	—
g. Do not use oxygen cylinders without properly fitted regulator valves. Never attempt to modify a regulator valve designed for another type of gas cylinder for use with an oxygen cylinder.	—	—
h. Check that all electrical equipment is properly grounded.	—	—
10. Discontinue the oxygen as follows:		
a. Shut off the regulator (flowmeter) control valve and check to see that the flow rate is zero.	—	—
b. Remove nasal cannula from patient.	—	—
c. Shut off main cylinder valve.	—	—

<b>Performance Measures</b>	<b>Go</b>	<b>No Go</b>
d. Bleed the regulator (flowmeter) control valve and main cylinder valve by opening the regulator control valve until the needle or ball indicator shows zero flow.	—	—
e. Close the regulator (flowmeter) control valve.	—	—
f. Remove regulator.	—	—
g. Replace cylinder valve cap.	—	—
<b>OVERALL EVALUATION</b>	—	—

**Written Exercises:**

1. How do you verify the contents of a cylinder?
2. What does "crack the oxygen cylinder" mean and what is the purpose of performing this action?
3. What is the difference between the regulator for M, G, and H oxygen cylinders and the regulator for D and E oxygen cylinders?
4. The face mask should be used to deliver oxygen at what flow rates? Why?

5. Define the following terms: Remaining cylinder pressure, safe residual level, available cylinder pressure, and duration of gas flow.
6. An "H" oxygen cylinder has 800 psi remaining pressure. The prescribed flow rate is 8 liters per minute. What is the duration of gas flow?
7. Describe 4 safety measures to use when setting up and administering oxygen using an "H" oxygen cylinder in a field environment.

#### References

- HQDA. (1984). Field manual: Medical specialist (FM 8-230, pp. 14-50 to 14-54). Washington, DC: Author.
- HQDA. (1990). Soldier's manual and trainer's guide: MOS 91C practical nurse, skill levels 2/3/4/5 (STP 8-91C25-SM-TG: Task 081-833-0018; Task 081-833-0019). Washington, DC: Author.
- HQDA. (1995). Soldier's manual and trainer's guide: MOS 91B medical specialist, skill levels 1/2/3/4/5 (STP 8-91B15-SM-TG: Tasks 081-830-3000 & 081-833-0019). Washington, DC: Author.
- Sanders, M. J. (Ed.). (1994). Mosby's paramedic textbook. St. Louis, MO: Mosby Lifeline.

## **1.06: Operate a Ventilator (66H, 66F, 91C)**

### **Introduction:**

This task summary describes operation of the Uni-Vent Model 750 ventilator (NSN 6530-01-327-0686). The following introductory information is taken from TM 8-6530-009-24&P, which is a good resource for further information regarding the use of Models 750 and 750M Uni-Vent portable volume ventilators.

The Uni-Vent Model 750 ventilator is portable, electronically controlled, time-cycled, and pressure limited. It is controlled by a microprocessor which continuously monitors a patient's airway pressure, all control settings, alarm parameters, and electrical power signals.

The ventilator is designed to provide ventilation or respiratory assistance to patients who cannot breathe normally because of illness, trauma, congenital defects, or drugs (e.g., anesthetics). It provides ventilatory support in multiple modes (control, assist, SIMV).

An air/oxygen blender is provided for use with the ventilator as an additional authorization list item. The blender mixes medical-grade air and oxygen to provide a pressurized gas source ranging from 21 to 100 percent oxygen.

### **Task Summary:**

#### **Conditions**

A respiratory specialist has checked a Uni-Vent Model 750 ventilator for proper functioning and has placed it on standby. A patient in your field MTF needs to be placed on a ventilator immediately, and no respiratory specialist is available to set up the ventilator and adjust it to the prescribed settings. You have been given the prescribed settings for the ventilator. You have the following equipment and supplies: Field table; Uni-Vent Model 750 ventilator (NSN 6530-01-327-0686); a nearby electrical source; required ventilator circuits; oxygen connecting tubing; 50 psi oxygen regulator; test lung; "H" oxygen cylinder in a secured position. All ventilator settings are initially at 0--except high alarm is at maximum setting.

#### **Standards**

Set up and calibrate a Uni-Vent Model 750 ventilator, perform a pressure check, and adjust the ventilator to the prescribed settings IAW the references.

Performance Measures	Go	No Go
1. Take the following steps to connect the ventilator to an electrical source:		
a. Connect AC power assembly of the multivoltage power supply to an electrical source.	—	—
b. Connect multivoltage power supply to the electrical jack on the ventilator marked EXT POWER.	—	—
<b>Note.</b> The multivoltage power supply provides for operation of the ventilator on AC and DC power sources, and it has a voltage selector switch which adjusts for 110 VAC or 230 VAC. It also serves as a source of electrical power for recharging the ventilator's internal batteries. Recharge time ranges from 14 to 16 hours, depending on the initial state of discharge. When the batteries are completely recharged, the ventilator can operate on internal battery power for 9 hours of continuous use.		
2. Take the following steps to connect the ventilator to a gas source:		
a. "Crack" oxygen cylinder to flush out any debris.	—	—
b. Attach 50 psi pressure regulator to oxygen cylinder.	—	—
c. Connect green high pressure hose from regulator to the GAS IN fitting on connector panel of ventilator.	—	—
<b>Note.</b> See Task 1.05 for cracking the oxygen cylinder and connecting the regulator. Refer to TM 8-6530-009-24&P for a detailed explanation of interconnecting a blender between an oxygen source and ventilator.		
<b>Warning.</b> The FLOW ADJUST control on the control module is calibrated to a 50-psi input pressure.		
3. Connect the 10-mm spiral hose between the GAS OUT tapered barb on the connector panel of the control module and the gas inlet port of the patient valve.	—	—
4. Connect the 1/8-in id hose between the TRANSDUCER hose barb on the connector panel of the control module and the transducer port of the patient valve.	—	—
5. Connect the 3/16-in id hose between the DEMAND VALVE barb on the connector panel of the control module and the demand valve port of the patient valve.	—	—
6. Perform transducer calibration prior to using the ventilator on each patient as follows:		
a. Set MODE selector switch to CAL.	—	—

Performance Measures	Go	No Go
b. Observe control module displays for the following:	—	—
(1) Alphanumeric display is blank.	—	—
(2) Digital bar graph illuminates one or more indicator lamps.	—	—
c. Depress and hold down the MEAN AIRWAY PRESSURE/CAL membrane switch for approximately 3 seconds.	—	—
d. Listen for a tone to start during the 3-second period.	—	—
e. Observe that the alphanumeric display remains blank during the 3-second tone.	—	—
f. When the tone stops, observe the following:	—	—
(1) the alphanumeric display shows "00" and	—	—
(2) the digital bar graph lamp illuminates between 0 and 2 cm H <sub>2</sub> O.	—	—
g. Turn MODE selector switch to another mode or to the OFF position.	—	—
<b>Warning.</b> Do NOT have the patient valve connected to the patient during this procedure.		
7. Allow the ventilator to undergo a self-test process as follows:		
a. Set the MODE selector switch to CTRL, ASSIST, or SIMV to start the self-test process.	—	—
b. Observe as the self-test displays current values of the following:	—	—
(1) TRANSDUCER CALIBRATION.		
(a) Alphanumeric display will show "00" if transducer is calibrated.	—	—
(b) If transducer calibration baseline exceeds $\pm$ 1 cm H <sub>2</sub> O, an audible tone will activate and display will alternately flash "—" and the current transducer calibration value. Do not attempt patient use.	—	—
(2) RATE.		
(3) INSPIRATION TIME.		
(4) LOW PRESSURE ALARM.		
(5) ASSIST/SIMV SENSITIVITY.		
<b>Note.</b> The self-test values show in the alphanumeric display for 1-second intervals. Their respective indicator lamps are also illuminated for 1-second intervals.		

Performance Measures	Go	No Go
c. If the ventilator fails the microprocessor memory portion of the self-test as indicated by the alphanumeric display continuously displaying FAL and a beeping alarm, turn the MODE selector switch to the OFF position and repeat the self-test.	—	—
d. If the self-test fails twice, notify the unit medical equipment repairer.	—	—
<b>Warning.</b> The self-test will only be performed with the patient valve disconnected from the patient. Do not attempt to use the ventilator on the patient if the self-test fails.		
8. Adjust machine to initial settings, such as:		
a. Flow Adjust - 1,000 ml/sec.	—	—
b. Inspiration - 1.0 seconds.	—	—
c. Rate - 12 breaths/minute.	—	—
<b>Note.</b> When you push the button next to a knob or adjust the knob itself, the current value will display for 3 seconds in the digital window.		
9. Perform a pressure check by occluding the circuit at the patient connector during the inspiratory phase. Monitor the digital bar graph display and alarms for leaks.	—	—
<b>Note.</b> There should be a steady rise in the digital bar graph display until it reaches the pressure limit, at which time the ventilator should cycle into the expiratory phase. If a leak is found in the patient circuit, the soldier should obtain a new circuit and repeat the pressure check.		
10. Set MODE as prescribed. For example, set the mode to IMV.	—	—
11. Set FIO <sub>2</sub> as prescribed.		
a. FIO <sub>2</sub> at 100% without a blender.	—	—
b. Connect oxygen blender to set FIO <sub>2</sub> lower than 100%.	—	—
12. Set RATE as prescribed. (For example, set the rate to 12 bpm.)	—	—
13. Set the prescribed tidal volume as follows:		
a. Tidal volume can be calculated by multiplying the FLOW ADJUST control setting (using ml/sec scale) by the INSPIRATION TIME control setting in seconds or fractions of seconds.	—	—
b. For example, set the FLOW ADJUST to 1000 & INSPIRATION to 0.8 sec. to get a tidal volume of 800 ml.	—	—

Performance Measures	Go	No Go
c. Refer to the decal affixed to the back of the control module for a tidal volume computation chart.	—	—
14. Set the high and low pressure alarms as follows:		
a. Depress the PEAK membrane switch to obtain the peak airway pressure. Hold membrane switch for 3 respirations to check the average peak pressure.	—	—
b. Set the high and low pressure alarms 10 cm H <sub>2</sub> O from the average peak airway pressure.	—	—
15. Adjust the ASSIST/SIMV SENSITIVITY control setting as prescribed to select the activation point of each assisted breath relative to the patient's inspiratory effort. Sensitivity of -2 is most commonly used. (Higher values may not trigger the ventilator because of the anti-asphyxiation valve.)	—	—
OVERALL EVALUATION	—	—

**Written Exercises:**

1. The ventilator can operate on internal battery power for \_\_\_\_\_ hours of continuous use.
  
2. How and when do you perform a transducer calibration?
  
3. Describe the self-test process.

4. What is the purpose of a pressure check? When should you perform a pressure check?

5. How do you calculate the tidal volume?

#### References

DMSB. (1994). DEPMEDS administrative procedures and clinical and support guidelines (3rd ed. draft). Fort Detrick, MD: Author.

HQDA. (1992). Unit, direct support and general support maintenance manual: Ventilator, volume, portable, models 750 and 750M. (TM 8-6530-009-24&P). Washington, DC: Author.

HQDA. (1991). Soldier's manual and trainer's guide: MOS 91V respiratory specialist, skill levels 1/2/3/4 (STP 8-91V14-SM-TG: Task 081-830-3009). Washington, DC: Author.

Impact Instrumentation, Inc. (1991). Instruction manual operation & service: Portable ventilator Uni-Vent™, 700 series, model 750/750M (Rev. B). West Caldwell, NJ: Author.

Whatmore, D. N. et al. (1991). Critical care guidelines: The Impact 750. In R. Zajtchuk, D. P. Jenkins, R. F. Bellamy, C. M. Quick, & C. C. Moore (Eds.), Combat casualty care guidelines (pp. 140-141). Washington, DC: Office of The Surgeon General.

## **1.07: Operate a Mobile Ultrasonic Cleaner (66E, 91D)**

### **Introduction:**

This task summary describes operation of the mobile ultrasonic cleaner (NSN 6530-01-254-4135). The following introductory information is taken from TM 8-6530-005-24&P, which is a good resource for further information regarding operation of the mobile ultrasonic cleaner.

The ultrasonic cleaner is a compact, mobile, self-contained unit that uses ultrasonic energy to remove biological debris from surgical and laboratory devices while they are soaking in a cleaning solution. The ultrasonic cleaner operation is controlled by an interval timer with an integral electrical power switch. The rotary knob of the timer provides from 0 (off) to 60 minutes of operation as set on the dial. A lamp is illuminated when the timer is energized.

The ultrasonic cleaner consists of an electronic ultrasound generator, ultrasonic transducers, and a tank. The ultrasound generator converts electrical energy into electronic signals which are transferred to the ultrasonic transducers. The transducers then generate ultrahigh frequency sound waves.

The ultrasonic transducers are bonded to the bottom of the tank and transmit the ultrasonic energy through the cleaning solution to solid objects in the tank. This action causes solid objects to vibrate. The vibration produces a "scrubbing" action between an object's dirty surface and the cleaning solution. Ultrasound also induces cavitation (the formation of partial vacuums in a liquid), which causes bubbles to form and implode. This action allows the cleaning of recesses in intricately shaped objects.

Cleaning solutions (either detergents or solvents) are added to water in the tank. Acids or strong solvents required for cleaning specific materials are typically placed into beakers with the materials to be cleaned and then placed in the tank filled with water.

### **Task Summary:**

#### **Conditions**

You are working in the Central Matériel Supply (CMS) in your field MTF and have just received a grossly contaminated minor tray from the operating room (OR). You have the following equipment and supplies: Table; mobile ultrasonic cleaner (NSN 6530-01-254-4135) that has not been set up for use; sonic cleaner; 1 grossly contaminated minor tray; 1 pair of disposable gloves.

#### **Standards**

Set up the mobile ultrasonic cleaner, process the instruments to be cleaned, and shut down the mobile ultrasonic cleaner IAW the references.

Performance Measures	Go	No Go
1. Start up the ultrasonic cleaner as follows:		
a. Move the ultrasonic cleaner to its operating position, leaving at least 6 inches clearance from other equipment or walls to allow for adequate air circulation.	—	—
b. Lock at least 2 caster assemblies to secure the ultrasonic cleaner in place.	—	—
c. After turning the timer knob to the "off" or "0" position, make sure there is proper grounding and connect the ultrasonic cleaner to electrical power.	—	—
<b>Warning.</b> Do not operate the ultrasonic cleaner unless proper grounding is verified. Serious injury or death by electrocution can result. Do not operate the ultrasonic cleaner unless the power module shipping brackets have been removed by a medical equipment repairer. Damage to the unit can result.		
d. Close drain valve and fill tank with 14 gallons of water.	—	—
<b>Warning.</b> Never operate the ultrasonic cleaner without a minimum liquid depth of 6 inches to prevent damage to the unit.		
e. Add sonic cleaner as recommended by the manufacturer of the cleaning solution.	—	—
<b>Note.</b> The chemical concentration of the cleaning solution is a critical factor in the cleaning process. Use the concentration recommended by the cleaning solution manufacturer. High concentrations of cleaning solution may inhibit ultrasonic activity.		
f. Set timer for approximately 15 minutes to start. Note that the ultrasonic cleaner will operate and the indicator lamp will light.	—	—
<b>Note.</b> A buzzing and/or a squealing sound will be emitted from the tank signifying the presence of ultrasonic energy. The sounds will vary throughout the operation of the ultrasonic cleaner. In addition, ripples will appear on the surface of the cleaning solution. These conditions are normal. The sound is reduced when material is in the tank. A squealing sound will also result from violent movement of the cleaning solution when lowering or raising the basket.		
<b>Note.</b> The solution will undergo a process called degassing, which is the release of trapped air from the cleaning solution. This process should take 10 to 15 minutes before full ultrasonic efficiency is achieved. Degassing should be performed after each tank filling or when the cleaning solution has been stagnant over a long period of time.		
2. Process instruments that are to be cleaned as follows:		
a. Put on a pair of disposable gloves.	—	—
b. Rinse instruments thoroughly using warm water to remove loose or surface soils.	—	—

Performance Measures	Go	No Go
c. Open all jointed items for maximum exposure of joints, jaws, blades, and locks.	—	—
d. Position and stack items in the basket using a crisscross layer pattern, with each layer placed in the opposite direction of the previous layer. Place heavy and bulky items on the bottom.	—	—
e. Lower basket into tank without scratching tank walls, ensuring that all instruments are covered with water.	—	—
f. Set timer for approximately 10-15 minutes.	—	—
<b>Note.</b> Cleaning time will depend on the amount, location, and type of soil to be removed. While most surface soils can be instantaneously removed, heavy soils imbedded in cracks, crevices, pores, and parts of layered items will increase cleaning time. Fewer items are cleaned better and faster.		
g. Upon completion of ultrasonic cleaning cycle, slowly and carefully remove basket of material.	—	—
h. Rinse cleaned parts with water (warm to hot water if available).	—	—
3. Drain water in the ultrasonic cleaner as follows:		
a. Gross contamination in water.	—	—
b. Cloudy, murky water.	—	—
c. Ultrasonic cleaner is expected to sit without use for a prolonged period of time.	—	—
4. Shut down the ultrasonic cleaner as follows:		
a. Disconnect electrical power.	—	—
b. Place cover on tank when the cleaning solution will be reused.	—	—
c. If the cleaning solution will not be reused, establish a drainage waste line by connecting a hose assembly to the drain valve or placing a bucket under the drain valve.	—	—
d. If a hose assembly is used, place a container suitable to hold the cleaning solution under the hose assembly.	—	—
e. Open and close the drain valve as required.	—	—
f. Rinse remaining residue from the tank.	—	—
g. Wipe the entire ultrasonic cleaner with a soft, damp cloth.	—	—

Performance Measures	Go	No Go
h. Place cover on the tank.	<hr/>	<hr/>
OVERALL EVALUATION	<hr/>	<hr/>

**Written Exercises:**

1. When you move the mobile ultrasonic cleaner to its operating position, make sure there is at least \_\_\_\_\_ inches of clearance from other equipment items or walls to allow for adequate air circulation.
2. Never operate the mobile ultrasonic cleaner without a minimum liquid depth of \_\_\_\_\_ inches to prevent damage to the unit.
3. After closing the drain valve, fill the tank of the mobile ultrasonic cleaner with \_\_\_\_\_ of water for normal use.
4. When using the mobile ultrasonic cleaner, you know that the degassing process should take \_\_\_\_\_ minutes before full ultrasonic efficiency is achieved. When should degassing be performed?
5. Describe the types of items you would place in the mobile ultrasonic cleaner for cleaning in your MTF.

**References**

- Atkinson, L. J., & Kohn, M. L. (1986). Berry and Kohn's Introduction to Operating Room Technique (FM 8-73). New York: McGraw-Hill.
- HQDA. (1991). Technical manual--Unit, direct support and general support maintenance manual: Cleaner, ultrasonic, mobile (TM 8-6530-005-24&P). Washington, DC: Author.
- Sonicor Instrument Corporation. (1987). Operating Instruction Manual--Mobile Ultrasonic Cleaner (Model MSC-900T-11/21). Copiague, NY: Author.

## **1.08: Operate a Field Sterilizer (66E, 91D)**

### **Introduction:**

This task summary describes operation of the field sterilizer (NSN 6530-00-926-2151). The following introductory information is taken from TM 8-6530-004-24&P, which is a good resource for further information regarding operation of the field sterilizer.

The field sterilizer is a self-contained unit consisting of a sterilizing assembly, a gasoline burner, a pump, and a case with doors. The case, with doors closed, encloses and protects the sterilizing assembly, gasoline burner, and pump. It also serves as the storage and shipment container. The case, with the front and rear doors open, provides an integral stand for the sterilizer. The sterilizer can operate from multiple voltages and frequencies, a gasoline burner, or direct steam.

Water is placed in the jacket of the sterilizer and the jacket is sealed. A water level indicator gauge is located at the rear of the sterilizer for monitoring the water level. Electrical immersion heaters or a gasoline burner heats the water in the jacket which produces steam. A valve directs the steam into the closed chamber for a sterilizing cycle. A timer on the front panel is used to indicate when the sterilizing cycle is complete. There also is a provision to allow for fast or slow steam exhaust from the chamber and vacuum drying of material.

### **Task Summary:**

#### **Conditions**

You have a minor tray that is wrapped in double-thickness muslin and needs to be sterilized. Power generators are available in your field MTF. You have the following equipment and supplies: Two field sterilizers (NSN 6530-00-926-2151) (One sterilizer is not in standing position, and one has been set up for use.); 1 minor tray ready for sterilization.

#### **Standards**

Set up the field sterilizer for use with electrical power and demonstrate how to sterilize a minor tray wrapped in double-thickness muslin IAW the references.

#### **Performance Measures**

**Go      No Go**

1. Set up the field sterilizer for use as follows:

a. Tilt up front of the sterilizer.

— —

b. Unlatch door in front and swing it down 180° into place as the front stand.

— —

Performance Measures	Go	No Go
c. Tighten the two thumb screws firmly into sterilizer case to anchor door.	—	—
d. Raise rear of sterilizer, unlatch the door, and swing it down into place as the rear stand. Tighten the two thumb screws into the sterilizer case.	—	—
e. Make sure that all packing material is removed from the sterilizer and that sterilizer is steady and level.	—	—
f. Arrange shelves inside sterilizer as desired.	—	—
2. Make sure that biomedical personnel have connected the sterilizer to the electrical power supply and that sterilizer is grounded.	—	—
3. Fill the jacket with water as follows:		
a. Establish drainage waste line (hose or bucket).	—	—
b. Close drain valve.	—	—
c. Turn operating valve to DRY position.	—	—
<b>Warning.</b> When water is required for continuous operation, do not remove filler plug while there is pressure in the jacket. Relieve pressure by lifting the handle on the safety relief valve or by turning the operating valve to DRY.		
d. Unscrew and remove plug from filling funnel.	—	—
e. Turn operating valve to STERILIZE position.	—	—
f. Fill jacket with water through funnel until sight glass shows water in 3/4 to FULL position.	—	—
g. Replace plug in filling funnel.	—	—
h. Turn operating valve to OFF position.	—	—
4. Prepare sterilizer for the sterilization cycle as follows:		
a. Turn power switch to the ON position. Red pilot light will glow.	—	—
b. Wait 10-15 minutes for the pressure to stabilize prior to using the sterilizer. Verify a pressure of 18 psi (15-20 psi) for 250°F or 29 psi (27-32 psi) for 270°F.	—	—
5. Perform a biological control or spore test before sterilizer is used for purposes of sterilization to make sure that the sterilizer will meet conditions of sterility.	—	—

Performance Measures	Go	No Go
6. Demonstrate the proper procedure for loading and sterilizing a minor tray wrapped in double-thickness muslin as follows:		
a. Open the door and load the sterilizer.	—	—
b. Close the door, rotate the quick-throw handle clockwise, and tighten the handle securely.	—	—
<b>Note.</b> The handle will not operate until the door locking arms are properly located in the end rings.		
c. Turn operating valve to STERILIZE position.	—	—
d. Start timer (a) once the jacket and chamber pressures are 29 psi and temperature is 270°F or (b) once jacket and chamber pressures are 18 psi and temperature is 250°F.	—	—
e. For the minor tray wrapped in double-thickness muslin, set the timer for exposure time of (a) 15 minutes for a jacket and chamber pressure of 29 psi/temperature 270°F or (b) 30 minutes for a jacket and chamber pressure of 18 psi/temperature 250°F (IAW FM 8-38 & FM 8-73).	—	—
<b>Note.</b> The most commonly recommended temperature and time parameters for gravity-displacement cycles are 10-25 minutes at 270-275°F & 15-30 minutes at 250°F (see AORN Standards.)		
f. At end of exposure period (when timer goes off), turn operating valve to FAST EXHAUST position.	—	—
g. When chamber pressure reaches 0, turn operating valve to DRY position and leave it there for 15 minutes (use the timer).	—	—
h. Turn operating valve to OFF position.	—	—
i. Loosen the chamber door locking arms and allow the load to cool for 5 minutes.	—	—
j. Unload the sterilizer.	—	—
k. If additional loads are ready for sterilization, make sure that the jacket water level is at least 1/4 full by observing the water level indicator gauge. Refill jacket with water as required.	—	—
<b>OVERALL EVALUATION</b>	—	—

### **Written Exercises:**

1. Describe the appropriate sterilization periods for fabric, solution, and instrument loads commonly used in your unit.
2. Describe the gasoline burner setup and preliminary operating procedures. Refer to TM 8-6530-004-24&P (for the field sterilizer) and TM 10-7360-204-13&P (for the field range with gasoline burner unit).
3. Describe 2 safety precautions to take when using the gasoline burner.

### **References**

Association of Operating Room Nurses, Inc. (1994). 1994 AORN standards & recommended practices. Denver, CO: Author.

Atkinson, L. J., & Kohn, M. L. (1986). Berry and Kohn's Introduction to Operating Room Technique (FM 8-73). New York: McGraw-Hill.

Atlantic Industries, Inc. (n.d.). Technical manual for lightweight field sterilizer: Model FS1986 (NSN 6530-00-926-2151). Hardeeville, SC: Author.

HQDA. (1979). Centralized matériel service/section (FM 8-38). Washington, DC: Author.

HQDA. (1990). Unit, direct support, and general support maintenance manual: Sterilizer (TM 8-6530-004-24&P). Washington, DC: Author.

HQDA. (1993). Soldier's manual and trainer's guide: MOS 91D operating room specialist, skill levels 1/2/3/4 (STP 8-91D14-SM-TG: Tasks 081-837-0036 & 081-837-0037). Washington, DC: Author.

Meeker, M. H., & Rothrock, J. C. (1991). Alexander's care of the patient in surgery (9th ed.). St. Louis: Mosby.

Perkins, J. J. (1969). Principles and methods of sterilization in health sciences (2nd ed.). Springfield, IL: Charles C. Thomas.

## **1.09: Operate a Field Operating Table (66E, 91D)**

### **Introduction:**

This task summary describes operation of the field operating table (NSN 6530-00-142-9239). The following introductory information is taken from the manufacturer's operating manual for the field operating table. This manual is a good resource for further information regarding use of the field operating table.

The operating table is a compact, easily transportable unit specifically designed for field use. It incorporates all features necessary for performance of major surgical operations. When folded for storage or shipment, the operating table and its accessory box are securely strapped into the shipping container.

The operating table is completely mechanical. All controls and locking devices are hand-operated. The base is designed to be water-filled for maximum stability and is equipped with four large caster wheels for mobility and four retractable foot pads for stationary positioning during operation.

The top frame of the operating table consists of a head, a back, a seat, and two leg sections. These sections can be placed in various surgical positions by means of position controls and locking devices. Each section has an X-ray top and a mattress pad, which can be securely installed without use of tools.

### **Task Summary:**

#### **Conditions**

You are preparing the equipment in your field operating room for use. You have been asked to set up the field operating table and check it for proper functioning. You have the following equipment and supplies: 1 field operating table (NSN 6530-00-142-9239) with accessories in the accessory box.

#### **Standards**

Operate a field operating table IAW the references and without injury to self or patient.

#### **Performance Measures**

**Go      No Go**

1. Unlatch and remove the shipping case top.      — —
2. Remove the accessory storage case and place it to one side.      — —
3. Unfasten the hold-down straps which secure the base of the operating table to the bottom section of the shipping case, and lift out the operating table.      — —

Performance Measures	Go	No Go
4. Raise all 4 foot pad pedals so that the unit is resting on the coaster wheels, and roll the unit to its intended location. Then press all pedals to the down and locked position so that the unit is resting on the foot pads.	—	—
5. Raise the back section until the release pins can be inserted through the V-shaped cast hangers on the underside of the seat section and the pivot holes of the back link assemblies.	—	—
6. Raise the leg sections to the horizontal position. They will lock automatically in this position.	—	—
7. Check to see that the drain plug (located beneath the base, directly below the filler plug) is present and securely tightened. Remove the filler plug, fill the base with fresh water, and reinstall the filler plug.	—	—
8. Remove the head section from the accessory storage case. Loosen the clamp knobs beneath the front end of back section and guide the head extender rods into the bearing holes in the front edge of the back section. Press the head section all the way in, and tighten the clamp knobs securely.	—	—
9. Attach the arm rests.	—	—
10. Position the mattress pads by removing the X-ray formica tops temporarily so that the elastic corner loops of the pads can be looped around the mounting pins of the formica tops.	—	—
11. Adjust the operating table into the following positions:		
a. Trendelenburg position.	—	—
b. Reverse Trendelenburg position.	—	—
c. Side tilt position.	—	—
d. Kraske (Jackknife) position.	—	—
e. Lithotomy position.	—	—
12. Demonstrate an understanding of safety measures for moving patients from the gurney onto the table and for working with patients on the table, to include locking the brakes on the gurney before transferring a patient from the gurney to the table.	—	—
<b>OVERALL EVALUATION</b>		

**Written Exercises:**

1. List the accessory items furnished with the operating table and explain how these items are used during surgical procedures.
2. List all of the positions of the field operating table used for surgical procedures performed in your MTF. Adjust the operating table into the positions that were not mentioned in the task summary.
3. Discuss possible alternatives to filling the base of the operating table with water.
4. Prepare the field operating table for shipping. This includes placing the items in the accessory storage case and packing this case and the table in the shipping case.

**References**

- Atkinson, L. J., & Kohn, M. L. (1986). Berry and Kohn's introduction to operating room technique (FM 8-73). New York: McGraw-Hill.
- Atlantic Industries, Inc. (1986). Operating and maintenance instructions for table, operating, field. Hardeeville, SC: Author.
- HQDA. (1993). Soldier's manual and trainer's guide: MOS 91D operating room specialist, skill levels 1/2/3/4 (STP 8-91D14-SM-TG: Tasks 081-837-0019, 081-837-0020, 081-837-0034 & 081-837-0035). Washington, DC: Author.

## **1.10: Operate an Electrosurgical Apparatus (66E, 91D)**

### **Introduction:**

This task summary describes operation of the Valleylab electrosurgical (ES) apparatus (NSN 6515-01-309-6647) in the monopolar mode. The original version of the task summary was more general and was also used with the Birtcher ES apparatus (NSN 6515-01-269-6056). The following introductory information is taken from TM 8-6515-003-24&P, which is a good resource for further information regarding operation of the Valleylab ES apparatus.

The purpose of the ES apparatus is to provide an alternative to the mechanical scalpel for cutting tissue. Advantages of an ES apparatus include simultaneous cutting and coagulation (hemostasis) and easier access to some surgical sites. The safe and effective use of the ES apparatus is dependent, to a large degree, upon factors under the control of operator personnel. Extra precautions may be necessary because of the presence of external or internal pacemakers and monitoring equipment, or the patient's condition. Prior to starting a procedure, the ES apparatus operator/user must be familiar with medical literature on the use, complications, and hazards of electrosurgery involving the surgical procedure. There is no substitute for highly trained and vigilant operator personnel.

Basic operation of the ES apparatus involves converting low frequency electrical power to high frequency electrical power for electrosurgical procedures. A complete circuit is required for current flow. In the monopolar mode, the circuit starts at the solid-state, high-frequency oscillator in the ES apparatus. The current passes through an active cable (e.g., the handswitching accessory cable); an electrode; a small volume of tissue; another electrode (the patient return electrode); the patient electrode cable; and back to the high-frequency oscillator. The patient return electrode must have a relatively large area of contact with the patient to disperse the current and to provide a low resistance exit path and low current density from the patient.

The Valleylab ES apparatus is a self-contained portable unit which may be placed on its mobile cart or any sturdy table for use. It is a solid state, microprocessor-controlled apparatus with self-test capability. The front panel controls and indicators allow operation in multiple modes with variable power levels. The monopolar footswitch is made of heavy cast metal and is explosion proof and splash proof. The attached cable assembly is 10 feet long. Pedals are labeled for CUT and COAG activation.

The handswitching pencil consists of a single piece body with an attached three-conductor cable and receptacle connector. The pencil body incorporates a rocker switch for selecting CUT or COAG modes of operation. The required electrode is inserted into the handswitching pencil by grasping the electrode by the insulating sleeve and inserting its round shank into the pencil until the insulating sleeve is inserted completely. Note that one pencil for the Valleylab ES apparatus can be sterilized and reused while another pencil is disposable.

The surgical handle consists of a two-piece serrated body which screws together to serve as the locking mechanism to firmly hold a variety of electrodes. The required electrode is inserted by twisting the barrel of the surgical handle one turn counterclockwise to open the chuck. Then the electrode is grasped by the insulating sleeve and its round shank is pushed into the surgical handle chuck until the insulating sleeve is inserted. The handle barrel is then twisted clockwise until snug to hold the electrode. The surgical handle includes a single conductor electrical cable and receptacle connector. The surgical handle can be sterilized and reused.

The disposable patient return electrode consists of a pad of conductive gel, an adhesive border, a two-conductor electrical cable, and the ES apparatus front panel PATIENT receptacle connector. The non-disposable (reusable) patient return electrode consists of a flat, stainless steel plate with two threaded studs mounted on one end which connects to the patient return electrode cable assembly. The patient return electrode does not require sterilization.

The patient return electrode cable assembly is used with the non-disposable patient return electrode. It consists of a two-conductor electrical cable, a front panel PATIENT receptacle connector, and two single conductor electrical connectors which thread onto the patient return electrode threaded lugs. The cable assembly can be sterilized and reused.

#### **Task Summary:**

##### **Conditions**

A patient is on the operating table in your field MTF and is being prepared for surgery. You have been asked to set up the electrosurgical (ES) apparatus for use. You have the following equipment and supplies: 1 Valleylab ES apparatus (NSN 6515-01-309-6647) with 1 disposable and 1 non-disposable patient return electrode, 1 monopolar handpiece; 1 monopolar foot pedal; 1 tube of electrode gel; and 1 full-body mannequin on a field operating table.

##### **Standards**

Prepare an ES apparatus to be used in the monopolar mode, adjust the coagulation and cutting settings, and place and remove first the disposable and then the non-disposable patient return electrode (grounding pad/plate) under an appropriate patient site IAW the references and safe technique.

##### **Performance Measures**

Go    No Go

1. Check the ES apparatus and equipment parts for sanitation and defects as follows:
  - a. Check all machine and wall receptacle outlets. \_\_\_\_\_
  - b. Check that the machine's explosion-proof power cord is not frayed or cracked and that the plug is not cracked or damaged. \_\_\_\_\_

Performance Measures	Go	No Go
c. If using a non-disposable patient return electrode (grounding plate), make sure that the grounding cord is not frayed or cracked, the connector is not bent, and the grounding plate is not bent or warped.	—	—
d. If using a disposable patient return electrode (grounding pad), make sure that the gel has not dried out and the grounding wire is not frayed or cracked.	—	—
<b>Warning.</b> A defective grounding device may cause electrical shock resulting in cardiac disturbances leading to death and/or sparks igniting flammable supplies.		
<b>Warning.</b> Electrosurgery uses radio frequency to cut and/or coagulate tissue. The sparking and heat can provide an ignition source. Accordingly, the ES apparatus is inherently unsafe for use with flammable anesthetics or other flammable gases, near flammable fluids or objects, or with oxidizing agents.		
<b>Note.</b> Provide a minimum of 4 inches of air space around the sides and top of the ES apparatus. It is normal for the top and back panel of the ES apparatus to become warm during continuous use for extended periods of time.		
2. Ensure that the ES apparatus is ready for operation as follows:		
a. Turn the electrical power on by pulling upward on the toggle switch, located on the back panel of the ES apparatus, to the "I" symbol.	—	—
<b>Note.</b> The ES apparatus will automatically undergo an internal self-test process. The three digital displays show "8"s, an audible tone sounds, and 13 indicators illuminate on the control panel.		
b. Verify the self-test process. If any of the self-test actions do not occur, turn the electrical power toggle switch to the "O" symbol and then back to the "I" symbol to operate the automatic self-test process again.	—	—
c. Continue to observe the control panel for the following control panel actions which should automatically occur:		
(1) The three digital displays show "---."	—	—
(2) The yellow STDBY indicator illuminates.	—	—
<b>Warning.</b> Do not operate the ES apparatus if any of the self-test actions do not occur. Notify your unit Medical Equipment Repairer.		
d. If all of the self-test actions occur, depress the white READY keyboard switch.	—	—
e. Observe the control panel and verify the following actions:		

Performance Measures	Go	No Go
<b>Note.</b> Steps (1) and (2) below are valid only when the patient return electrode is disconnected from the PATIENT receptacle.		
(1) The alarm tone sounds twice.	—	—
(2) The red alarm indicator illuminates.	—	—
(3) The green READY indicator illuminates.	—	—
(4) The three digital displays show a "1".	—	—
(5) The yellow MONOPOLAR indicator illuminates.	—	—
(6) The yellow PURE indicator illuminates.	—	—
<b>Warning.</b> Do not operate the ES apparatus if any of the READY mode actions do not occur. Notify your unit Medical Equipment Repairer.		
f. Depress the white keyboard switch to return the ES apparatus to the standby mode until use is required.	—	—
<b>Note.</b> Observe that the yellow STDBY indicator illuminates and the three digital displays show "---."		
3. Select the mode and power levels as directed by the surgeon as follows:		
a. Depress the white READY keyboard switch to activate the ES apparatus. Verify that the green READY indicator illuminates.	—	—
b. Select the CUT mode and power as follows:		
(1) Select the CUT mode (PURE CUT, BLEND 1, BLEND 2, or BLEND 3) by depressing the desired yellow keyboard switch. Observe that the corresponding yellow indicator illuminates.	—	—
(2) Set the CUT POWER by depressing the yellow up and down keyboard switches until the required setting shows in the center digital display. The available wattage ranges from 1 to 300.	—	—
<b>Note.</b> A single depression of the up or down keyboard switch increases or decreases the digital display setting by 1 watt. Continuous depression of either switch gradually increases or decreases the digital display setting to the maximum or minimum. The initial continuous depression of either keyboard switch until the desired setting is within several digits and then the momentary depression of either switch will allow the desired setting to be obtained rapidly.		

Performance Measures	Go	No Go
(3) Select the MONOPOLAR footswitch selector by depressing the desired white keyboard switch. Observe that the selected footswitch indicator illuminates.	—	—
c. Select the COAG mode and power as follows:		
(1) Select the COAG POWER by depressing the blue up and down keyboard switches until the required setting shows in the right-hand digital display. The available wattage ranges from 1 to 120.	—	—
(2) Select the MONOPOLAR footswitch selector by depressing the desired white keyboard switch. Observe that the selected footswitch indicator illuminates.	—	—
d. Depress the white STDBY keyboard switch to return the ES apparatus to the standby mode. Observe that the yellow STDBY indicator illuminates.	—	—
<b>Note.</b> All mode and wattage settings will be retained in the microprocessor memory of the ES apparatus. The indicators and displays will automatically show when the ES apparatus is returned to the READY mode. However, if the electrical power toggle switch is pushed down to the "O" symbol and back to the "I" symbol, the MONOPOLAR indicator and the PURE indicator will illuminate.		
<b>Note.</b> If the proper wattage is not known from personal experience, the surgeon should start with a very low setting and cautiously increase the wattage until the desired effect is achieved. Failure of the ES apparatus to produce the desired effect at normal wattage settings may indicate faulty application of the patient return electrode or failure of an accessory cable. Do not increase wattage settings before checking for problems with accessory cables or misapplication of the patient return electrode. Effective contact between the patient and the patient return electrode should be verified if a patient is repositioned after the initial application of the electrode.		
<b>Warning.</b> Special precautions should be taken when using electrosurgery in close proximity to or in direct contact with any metal objects including Gomco clamps, Kocher clamps, and hemostats. Such electrosurgical use, particularly over prolonged periods of time, could result in unintentional and unwanted tissue destruction and burns.		
4. Select an appropriate patient site for placement of the patient return electrode (grounding device) as follows:		
a. Site should be well vascularized (e.g., have no scar tissue).	—	—
b. Site should have no excessive hair.	—	—
c. Site should have no bony prominence that might result in pressure points.	—	—

Performance Measures	Go	No Go
d. Site should be as close to the surgical site as practicable (to minimize the flow of electrical current through the patient).	<hr/>	<hr/>
5. Place disposable patient return electrode (grounding pad) on patient as follows:		
a. Check with anesthetist before moving the patient to place grounding pad.	<hr/>	<hr/>
b. Explain procedure to the patient if possible.	<hr/>	<hr/>
c. Shave, clean, and dry the selected site as needed.	<hr/>	<hr/>
d. Peel off protective covering from the adhesive pad.	<hr/>	<hr/>
e. Check for dry spots on pre-lubricated pad. If pad has dry spots, obtain a new one.	<hr/>	<hr/>
f. Apply the pad firmly to an appropriate site.	<hr/>	<hr/>
<b>Note.</b> Application of additional electrode gel is not required for the disposable patient return electrode (grounding pad). The disposable grounding pad is to be used only one time. Do <u>not</u> sterilize or reuse it.		
6. If a disposable patient return electrode (grounding pad) is not available in your field environment, place a non-disposable patient return electrode (grounding plate) under the patient as follows:		
a. Check with anesthetist before moving the patient to place grounding plate.	<hr/>	<hr/>
b. Explain procedure to the patient if possible.	<hr/>	<hr/>
c. Loosen safety strap from patient's legs.	<hr/>	<hr/>
d. Shave, clean, and dry the selected site as needed.	<hr/>	<hr/>
e. Spread small amount of electrode gel evenly over the entire grounding plate.	<hr/>	<hr/>
f. Lift or roll patient to apply grounding plate, taking care not to push the plate under the patient.	<hr/>	<hr/>
g. Make sure that the metal connection between the grounding plate and connector cord do not touch the patient and that cord does not become dislodged.	<hr/>	<hr/>
h. Place the grounding plate as close to the surgical site as practicable to minimize the flow of electrical current through the patient.	<hr/>	<hr/>
i. Secure the safety straps.	<hr/>	<hr/>

Performance Measures	Go	No Go
<b>Warning.</b> Improper placement of the patient return electrode can cause electrical burns to the patient.		
<b>Note.</b> Wait for completion of the draping procedures before connecting the electrodes to the unit.		
7. Connect the patient return (inactive) electrode to the ES apparatus as follows:		
a. Move the ES apparatus close to the operating table on the same side as the patient return electrode, maintaining a safe distance from the sterile field.	—	—
b. Ensure that the ES apparatus is not activated or is in the STDBY mode.	—	—
c. If using a disposable patient return electrode - connect the female connector of the electrode into the MONOPOLAR PATIENT receptacle. Seat it firmly.	—	—
d. If using a non-disposable patient return electrode - connect the patient return electrode to the patient return cable assembly by screwing the cable connectors onto the threaded studs. Ensure that the threaded connections are tight. Then connect the female patient connector into the MONOPOLAR PATIENT receptacle. Seat it firmly.	—	—
8. Connect the active electrode to the ES apparatus as follows:		
a. Receive the connecting end of the active electrode from the scrub.	—	—
b. Ensure that the ES apparatus is not activated or is in the STDBY mode.	—	—
c. If the surgical handle is being used - plug the surgical handle cable assembly connector into the MONOPOLAR HANDSWITCH receptacle.	—	—
d. If the handswitching pencil is being used, insert the male connector into the MONOPOLAR HANDSWITCH receptacle.	—	—
9. Connect the monopolar footswitch to the ES apparatus as follows:		
a. Ensure that the ES apparatus is not energized or is in STDBY mode.	—	—
b. Attach the male, 4-pin connector on the monopolar footswitch to its mating female receptacle on the back panel of the ES apparatus by aligning the keyways, pushing the connector collar inward, and then turning the knurled sleeve clockwise until tight.	—	—
c. Place the footswitch on the floor close to the surgeon's foot for easy use.	—	—
<b>Note.</b> An active electrode with a built-in hand control is often used. This eliminates the need for a footswitch.		

Performance Measures	Go	No Go
10. Adjust the wattage settings as needed during the surgical procedure as follows:		
<b>Note.</b> Controls on the front panel are disabled when an accessory is activated.		
a. Deactivate the handswitch or footswitch being used.	—	—
b. Depress the appropriate CUT POWER or COAG POWER up or down keyboard switch until the required setting shows in the applicable digital display.	—	—
c. Resume the surgical procedure.	—	—
11. Observe recommended safety actions during surgical procedures as follows:		
a. Keep wattage settings as low as practical to enhance patient and operating room personnel safety.	—	—
b. Remove eschar accumulation from electrodes to maintain the surgical effect.	—	—
c. Avoid unnecessary and prolonged activation of the ES apparatus to reduce the possibility of alternate site burns which may be caused by radio frequency leakage currents.	—	—
d. Check accessories, accessory cables, and the patient return electrode for proper application and/or continuity if a higher than normal wattage setting is required.	—	—
e. Keep accessory cables separated when multiple accessories are used. Do not twist, clamp, or bundle them together.	—	—
<b>Warning.</b> Keep active accessories away from the patient when they are not being used.		
12. Disconnect and remove the ES apparatus on instructions from the surgeon or at completion of the surgical procedure in the following sequence:		
a. Turn wattage to the lowest settings.	—	—
b. Turn the ES apparatus off.	—	—
c. Disconnect the active and inactive connections from the machine.	—	—
d. Loosen the safety strap.	—	—
e. Remove the inactive grounding device from the patient.	—	—
f. Remove the electrode gel from patient.	—	—
g. Secure the safety strap.	—	—
h. Return footswitch to the storage area.	—	—

Performance Measures	Go	No Go
i. Move the ES apparatus to the side and out of the way.	—	—
j. Disinfect the ES apparatus and non-disposable grounding plate IAW unit SOP.	—	—
13. When removing the inactive grounding device, check the patient for burns of the area where the grounding plate was placed.	—	—
14. Clean and/or sterilize the ES apparatus, operating accessories, and footswitch as follows:		
a. Clean the ES apparatus as follows:		
(1) Ensure that the ES apparatus is turned off and the electrical power cord is disconnected.	—	—
(2) Wipe control cover, front and back panels, and electrical power cord with a mild detergent solution and damp cloth and dry with a soft cloth.	—	—
b. Clean the footswitch using standard unit SOP for surgical equipment.	—	—
c. Clean and sterilize reusable surgical handles, electrodes, and accessory cables as follows:		
(1) Remove gross matter (blood, mucus, and tissue) by wiping the surgical handles, cables, and electrodes with a cloth or gauze pad and a mild cleaning solution or blood dissolving agent.	—	—
(2) Remove any cleaning agent by wiping them with a water dampened cloth.	—	—
(3) Wrap the surgical handles and cables.	—	—
(4) Sterilize using standard steam sterilization procedures.	—	—
d. Clean and sterilize the handswitching pencil as follows:		
(1) Remove gross matter (blood, mucus, or tissue) by wiping the pencil with a cloth or gauze pad and a mild cleaning solution or blood dissolving agent.	—	—

Performance Measures	Go	No Go
<b>Warning.</b> Do not immerse the pencil in solutions.		
(2) Remove any cleaning agent by wiping the pencil with a water dampened cloth.	—	—
(3) Dry thoroughly with a soft cloth.	—	—
<b>Note.</b> The pencil should be processed with other delicate surgical instruments to protect the electronic components.		
(4) Lay the handswitching pencil in the center of the wrapping material.	—	—
(5) Fold the material over the pencil body, coil the cable lengthwise around the material, and then apply another cloth wrapper to the packet.	—	—
<b>Warning.</b> The pencil body, cable, and connector should not contact each other to prolong the useful life of the pencil.		
<b>Note.</b> Do not use rubber bands, string, or tape to secure the cable.		
(6) Sterilize the pencil IAW standard unit procedures for steam sterilization.	—	—
<b>Warning.</b> Do not exceed a processing temperature of 135°C (275°F) for 20 minutes to prevent decreasing the useful life of the pencil.		
<b>Note.</b> Ethylene oxide is the recommended method of sterilization, but steam sterilization can be used in a field environment.		
e. Clean the non-disposable patient return electrode as follows:		
(1) Clean the electrode using any hospital-grade detergent and a damp cloth or IAW unit SOP.	—	—
<b>Warning.</b> Do not use caustic, corrosive, or abrasive cleaning materials to prevent damage to the electrode.		
(2) Dry the electrode thoroughly with a soft cloth.	—	—
<b>OVERALL EVALUATION</b>	—	—

**Written Exercises:**

1. List 5 general safety precautions to observe when using an ES apparatus in a field environment.
  
  
  
  
  
2. Describe the safety precautions that relate to use of (a) the disposable grounding pad and (b) the non-disposable grounding plate.
  
  
  
  
  
3. Describe the correct procedure for spreading the electrode gel on the non-disposable grounding plate.  
What is your rationale for using this procedure?

**References**

Birtcher Corporation. (1990). Operating and service manual: Birtcher Model 774 Electrosurgery Unit. El Monte, CA: Author.

HQDA. (1993). Soldier's manual and trainer's guide: MOS 91D operating room specialist, skill levels 1/2/3/4 (STP 8-91D14-SM-TG: Task 081-837-0012). Washington, DC: Author.

HQDA. (1993). Unit, direct support, and general support maintenance manual: Electrosurgical apparatus model force 2 (TM 8-6515-003-24&P). Washington, DC: Author.

Valleylab, Inc. (1990). Force 2 electrosurgical generator service manual (NSN 6515-01-309-6647). Boulder, CO: Author.

## **1.11: Operate an Intermittent Suction-Aspirator System (66E, 91D)**

### **Introduction:**

This task summary describes operation of the Impact Model 306M (Military) programmable intermittent suction-aspirator system (NSN 6515-01-267-2726 (suction apparatus with cart) or NSN 6515-01-267-2727 (suction apparatus with collection system)). This suction-aspirator system is designed for use during surgical procedures in the operating room.

Model 306M operates on 115/230 volts alternating current (VAC), 50/60 HZ; internal 12 volts direct current (VDC) rechargeable batteries; or external 12 VDC. The Master Power switch is used to energize the entire system, and the Power Mode switch is used to select VAC & Recharge or Internal 12 VDC. The Suction Mode switch is used to select Continuous or Intermittent suction. The Suction Level switch is used to select one of two operating limits for vacuum: 0-200 mm Hg (Low Vacuum) or 0-550 mm Hg (High Vacuum). The vacuum control knob is used to turn on and adjust the Electronic Vacuum Regulator (EVR), which works in conjunction with the Suction Level switch. To prevent dangerous high vacuum levels during intermittent suctioning, a safety lockout allows the intermittent mode to operate in the Low Vacuum level range only. The ON and OFF time suction circuits can be set to the desired range for intermittent suctioning.

### **Task Summary:**

#### **Conditions**

A patient is on the operating table in your field MTF and is being prepared for surgery. You have been asked to set up the intermittent suction-aspirator system for use during the next surgical procedure and to check the system for proper functioning. You have the following equipment and supplies: 1 intermittent suction-aspirator system (NSN 6515-01-267-2726 or 6515-01-267-2727); connecting tubing, 1 filter; 1 overflow valve; 1 set of collection jars necessary for setting up the system; 1 large basin of water.

#### **Standards**

Set up an intermittent suction-aspirator system and operate the system on continuous suction/high vacuum mode at 100 mm Hg IAW the references.

Performance Measures	Go	No Go
1. Before placing the suction-aspirator system into operation, perform the following operational checks to ensure proper performance:		
a. Verify operating power selections at 115 or 230 volts alternating current (VAC), internal rechargeable batteries, and/or external 12 volts direct current (VDC) as required for operation.	—	—
b. Verify continuous operation at both high and low ranges in each of the operating power modes.	—	—
c. Verify that intermittent suction operates only in the low vacuum range in each of the operating power modes.	—	—
d. Test the Electronic Vacuum Regulator by adjusting vacuum in the high and low ranges in each of the operating power modes.	—	—
<b>Note.</b> The internal battery pack provides 1 hour of operating time at maximum vacuum. The battery is not intended for routine, day-to-day use. Use of the battery pack should be restricted to emergencies and transport to make sure power is available when needed. Model 306M requires 16 hours to fully recharge its fully discharged batteries. However, the batteries are rarely discharged this much so the subsequent recharge time is usually less.		
2. Set up a suction-aspirator system for use during a surgical procedure as follows:		
<b>Note.</b> The following interconnections are required when using the Impact collection system.		
a. Connect the 8" corrugated hose from the vacuum inlet to the top inlet of the overflow shutoff valve and insert valve into the holder on the back of the suction-aspirator system.	—	—
<b>Note.</b> Always use the overflow shutoff valve provided with the unit to protect the suction mechanism from overflows which may permanently damage the vacuum pump.		
b. Connect a 3/8" internal diameter (ID) hose between the bottom inlet of the overflow shutoff valve and the disposable filter.	—	—
c. Connect a 1/4" ID x 18" long hose between the patient collection side of the disposable filter and collection jar # 2.	—	—
<b>Note.</b> Do NOT bypass the filter. It is designed to retain bacteria which would otherwise be exhausted into the immediate vicinity. Replace filter (a) when discoloration of its membrane occurs, (b) when its membrane comes in contact with aspirate, or (c) following 150 hours of use.		

Performance Measures	Go	No Go
d. Connect a 1/4" ID x 12" long hose between collection jars #2 and #1.	—	—
e. Receive sterile collection tubing (1/4" ID x 5 foot long) from the scrub and connect to collection jar #1.	—	—
3. Operate the suction-aspirator system on continuous suction/high vacuum mode at 100 mm Hg using a basin of water as a simulated sterile field as follows:		
a. Turn Master Power switch on and verify that its indicator lamp illuminates	—	—
b. Select VAC & RECHARGE Power Mode and verify that its indicator lamp illuminates.	—	—
c. Select CONTINUOUS Suction Mode.	—	—
d. Select HIGH VACUUM Suction Level.	—	—
e. Adjust vacuum regulator setting at 100 mm Hg as follows:		
(1) Turn the vacuum control knob clockwise to its ON position.	—	—
(2) Block the free flow of air through the system by pinching the tubing closed.	—	—
(3) Rotate the vacuum knob to the desired vacuum level.	—	—
(4) Verify the desired vacuum level by reading the front panel vacuum gauge.	—	—
(5) Open the tubing.	—	—
f. Suction water out of the basin.	—	—
4. Problem solve as needed when the suction-aspirator system fails to operate properly, verifying the integrity of tubing connections, tubing, fittings, and control settings as follows:		
a. Isolate the problem by checking for vacuum at the inlet of each item, tracing backwards through the system as follows:		
(1) Vacuum from jar #2 to jar #1.	—	—
(2) Vacuum from filter to jar #2.	—	—
(3) Vacuum from overflow shutoff valve to filter.	—	—
(4) Vacuum from rear panel vacuum inlet to the overflow shutoff valve.	—	—
b. Check the integrity of the vacuum hoses and tubing, making sure that the tubing has no crimps or cuts in it.	—	—

Performance Measures	Go	No Go
c. Ensure that collection jars seal properly and overflow shutoff valve does not stick.	<input type="checkbox"/>	<input type="checkbox"/>
<b>Note.</b> If the actions described above do not resolve the operating problem, contact your unit Medical Equipment Repairer.		
5. Place the unit in a recharge state as needed in the following manner:		
a. Turn Master Power Switch ON and verify that its indicator lamp illuminates.	<input type="checkbox"/>	<input type="checkbox"/>
b. Select VAC & RECHARGE Power Mode and verify that its indicator lamp illuminates.	<input type="checkbox"/>	<input type="checkbox"/>
c. Verify that the Vacuum ON/OFF/ADJ switch is clicked off and its respective indicator is unlit.	<input type="checkbox"/>	<input type="checkbox"/>
<b>Note.</b> During normal AC operation, a charging current automatically flows into the batteries keeping them replenished while normal operating power requirements are met.		
<b>Note.</b> Periodically or as indicated, the exterior case should be cleaned using a mild, non-abrasive cleanser. Disinfectant spraying is recommended at regular intervals. Do not allow liquids to enter the control system. Collection jar systems should be cleaned or disposed of IAW their respective instructions. Impact's reusable collection jar, its cover, and metal hose connectors can be autoclaved. The overflow shutoff valve should be cleaned in warm, soapy water or with a mild disinfectant solution when contacted with aspirate or following 150 hours of cumulative use. Dry thoroughly before reassembling.		
<b>OVERALL EVALUATION</b>		

#### Written Exercises:

1. Explain the purposes of using the overflow shutoff valve and the filter with the suction aspirator system.
2. How long can you use the suction aspirator system while operating on its internal battery pack?
3. Describe the proper procedure for cleaning the suction aspirator system.

#### Reference

Impact Instrumentation, Inc. (1987). Instruction manual operation & service: 306 series programmable intermittent suction-aspirator system (NSN 6515-01-267-2726 or NSN 6515-01-267-2727). (Rev. E). West Caldwell, NJ: Author.

## **1.12: Operate a Pulsed Irrigation and Suction System (66E, 91D)**

### **Introduction:**

This task summary describes operation of the Stryker OrthoLav Pulsed Irrigation and Suction System (NSN 6530-01-237-6088). The following information is taken from the manufacturer's operator/maintenance manual (Stryker<sup>®</sup> Surgical, 1989), which is a good resource for further information.

Pulsed irrigation works on the principle that a pulse of fluid will compress tissue and, during the interpulse phase, the tissue will spring back freeing loose particles and debris. The next pulse will wash the debris and foreign particles away.

The Stryker OrthoLav Pulsed Irrigation and Suction System produces distinct jets of water with an interpulse phase to allow for tissue compression and decompression. The large Stryker handpiece tubing set and some tips also have a suction lumen so the irrigation from the pulsation can be removed. This is important so the pulsation can continue to compress the tissue and not splash irrigant.

The Stryker OrthoLav Pulsed Irrigation and Suction System consists of:

- OrthoLav Unit. An electrically powered motor with a patented concentric wheel that pumps fluid at the rate of 1000 pulses/min. Each pulse is 1 ml in volume.
- Large Handpiece and Tubing Set. The handpiece has finger tip control for irrigation and suction. The irrigation activation hole is recessed to prevent inadvertent activation. The suction control allows intermittent or constant suctioning. The tubing provides a closed, sterile fluid path from IV to patient.
- Tips. All tips have atraumatic suction capability so they will not clog or grab tissue. Tips are available with single or multiple orifices.

### **Task Summary:**

#### **Conditions**

A patient is on the operating table in your field MTF and is being prepared for surgery. You have been asked to set up the pulsed irrigation and suction system (sometimes referred to as a pulse lavage irrigator) and check it for proper functioning. You have the following equipment and supplies: 1 Stryker OrthoLav Pulsed Irrigation and Suction System (NSN 6530-01-237-6088); IV tubing attached to 1 liter IV bag of any type fluid; 1 Stryker disposable large handpiece and tubing set (NSN 6530-01-184-1239); 1 disposable straight multiple orifice tip (NSN 6530-01-184-1240); 1 large basin; 1 assembled intermittent suction-aspirator system (NSN 6515-01-267-2726 or NSN 6515-01-267-2727).

### Standards

Set up a pulsed irrigation and suction system for use during a surgical procedure and operate the machine IAW the references.

### Performance Measures

Go    No Go

**Warning.** Prior to use, the pump unit and its components should be operated and inspected for any damage. Do not use if damage is apparent.

1. Set up the pulsed irrigation and suction system for use during a surgical procedure as follows:

- a. Place pump unit on a table near but outside sterile field of surgical site. — —
- b. Using sterile procedure, drop contents of tubing set pack into sterile field. Repeat procedure for irrigator tip. — —
- c. Keep handpiece portion of tubing set within sterile field and pass remaining portion of tubing set for installation into pump unit. — —
- d. Open pump cover and roll large portion of irrigation tubing with white connector around pump roller head. — —
- e. Insert white connector into slot. — —
- f. Close pump cover. Push in and twist latch to secure. — —
- g. Turn power switch on front of unit to ON position. Place pinch clamp switch in UP position and insert small portion of irrigation tubing. Release pinch clamp switch to DOWN position to secure tubing. — —

**Note.** Holding pinch clamp switch in up position for 6 seconds or longer may result in tripping circuit breaker. If so, reset circuit breaker.

- h. Turn power switch OFF to prevent inadvertent operation of unit while completing the tubing connection. Place small irrigation tubing behind the two retainer clips. — —
- i. Attach suction line tube of tubing set to the intermittent suction-aspirator system. — —

**Note.** Always use a suction canister between the Stryker tubing set and suction source.

- j. Place irrigation control filter onto irrigation control hole. — —
- k. Spike irrigation source. — —
- l. Turn pump unit on. — —

Performance Measures	Go	No Go
2. Operate the pulsed irrigation and suction system, using a basin of water as a simulated sterile field, as follows:		
a. Attach irrigator tip to handpiece using sterile technique.	—	—
b. To activate irrigation, place finger over irrigation control hole on handpiece. Remove finger from hole to stop irrigation.	—	—
c. To activate suction, place finger over suction control hole on handpiece. Remove finger from hole to stop suction. For continuous suction, slide suction control bar over suction control hole. Slide suction control bar forward to discontinue continuous suction.	—	—
d. Cover both suction and irrigation holes to suction and irrigate at the same time.	—	—
<b>Note.</b> When the pulsed irrigation and suction system is being used during a surgical procedure, the circulator should monitor the suction and irrigation fluid levels.		
3. Problem solve as needed when there are difficulties operating the pulsed irrigation and suction system as follows:		
a. If the pump unit won't run and the power switch light is green -	—	—
(1) Make sure pump cover latch is properly secured by turning it clockwise. Adjust tubing if necessary.	—	—
(2) Make sure irrigation control filter is secured to irrigation control port.	—	—
b. If the pump unit won't run and the power switch light is <u>not</u> green -	—	—
(1) Check electrical plug to make sure pump unit is properly plugged into the electrical outlet.	—	—
(2) Depress red circuit breaker switch on back of pump unit and release.	—	—
c. If irrigation line leaks or drips when pump unit is not running -	—	—
(1) Make sure tubing is placed under tubing position indicator on sides of pinch clamp.	—	—
(2) Make sure pinch clamp switch is in the DOWN position.	—	—
d. If pump unit activates when irrigation control filter is placed on irrigation control port - tubing is blocked. Use new tubing set.	—	—

Performance Measures	Go      No Go
e. If pump unit operation exhibits delayed starting or stopping via handpiece activation - adjust recessed set screw with a screwdriver on back of pump unit for activation sensitivity. Pump unit will have to be activated and deactivated via irrigation control hole on handpiece or irrigation control port as adjustment is made.	— —
4. Unplug the pump unit and clean as follows:	
a. Use a damp cloth with a disinfectant to periodically clean all external areas of the pump unit IAW unit SOP.	— —
b. Do <u>not</u> allow liquids to splash inside the pump unit, do <u>not</u> immerse the pump unit in any liquid, and do <u>not</u> autoclave the pump unit.	— —
c. The tubing set and tips are sterile disposables and are designed for single use only. Do <u>not</u> resterilize or reuse them.	— —
OVERALL EVALUATION	— —

#### Written Exercises:

1. Describe the principles underlying operation of the pulsed irrigation and suction system.
2. List 2 surgical procedures for which a pulsed irrigation and suction system is used.
3. Explain 2 safety precautions to take when the pulsed irrigation and suction system is being used during a surgical procedure.

#### References

Stryker® Surgical. (n.d.). Stryker® OrthoLav 202 pulsed irrigation and suction instruction manual. Kalamazoo, MI: Author.

Stryker® Surgical. (1989). Stryker® OrthoLav 202-100 operator/maintenance manual. Kalamazoo, MI: Author.

## **113: Set Up a Blood Recovery and Delivery System (66F, 91D)**

### **Introduction:**

This task summary describes the set up of the Haemonetics Cell Saver 4 Autologous Blood Recovery System (NSN 6516-01-240-6883). The following information is taken from the USAMMA training materials (which are accompanied by training videotapes) listed in the reference section. Both the USAMMA training materials and the manufacturer's operating, maintenance, and service manuals should be consulted when planning and conducting training.

The Blood Recovery and Delivery System (Cell Saver 4 Autologous Blood Recovery System) provides autologous transfusion in the operating room. Autologous transfusion is a process by which a patient receives his own blood after it has been collected from an open wound or the surgical field via a suction apparatus and cleansed. Receiving one's own blood during or after surgery reduces the need for stored blood. It also eliminates transmission, the need for blood typing, and reactions associated with the donor transfusion process. This system reduces patient risk and provides the surgical team with a continuous compatible blood source.

The Blood Recovery and Delivery System is microprocessor controlled, operates primarily in the automatic mode, and contains programmed operator and maintenance diagnostic functions for troubleshooting.

### **Task Summary:**

#### **Conditions**

A surgeon in your field MTF has asked you to set up a Haemonetics Cell Saver 4 Autologous Blood Recovery System for use during the next surgical procedure. You have the following equipment and supplies: 1 Haemonetics Cell Saver 4 Autologous Blood Recovery System (NSN 6516-01-240-6883); 1 Haemonetics Basic Collection Pack (NSN 6515-01-185-2406); 1 Haemonetics Basic High Speed Cell Saver Pack (NSN 6515-01-169-7785); 2 bags of Sterile Normal Saline solution (1 or 3 liter bags); 1 assembled intermittent suction-aspirator system (NSN 6515-01-267-2726 or NSN 6515-01-267-2727).

#### **Standards**

Set up a Haemonetics Cell Saver 4 Autologous Blood Recovery System for use during a surgical procedure using sterile technique and IAW the references.

#### **Performance Measures**

**Go      No Go**

1. Prepare 1 liter of saline with 30,000 units of Heparin. \_\_\_\_\_
2. Use HELP program to set up the system. \_\_\_\_\_

Performance Measures	Go	No Go
<b>Warning.</b> Store all disposables in a dry, well-ventilated area free from exposure to chemical vapors. Avoid tracking chemicals to the surface of disposable plastic components by making sure that hands or gloves contacting the plastic surface are clean and dry.		
3. Raise IV pole to full extension.	—	—
4. Secure sterile collection liner at all 4 corners of the autotransfusion reservoir.	—	—
5. Secure reservoir door closed with handle locked forward, and top clamp rotated down.	—	—
6. Close reservoir drain clamp.	—	—
7. Aseptically pass double lumen suction tubing into sterile field. This tubing is used to collect and anticoagulate shed blood.	—	—
8. Receive suction tubing from the sterile field and attach to reservoir, securing <u>blue</u> -tipped tubing tightly to <u>blue</u> inlet port on reservoir liner. This will allow for fluids to be collected in the collection reservoir.	—	—
9. Clamp anticoagulant line of the double lumen suction tubing to prevent premature gravity drainage of the anticoagulant solution.	—	—
10. Spike anticoagulant solution.	—	—
11. Hang anticoagulant bag on IV pole. (The line is now ready to suction and anticoagulate blood simultaneously to prevent unwanted clotting.)	—	—
12. Firmly attach suction apparatus tubing to vacuum inlet at rear of reservoir.	—	—
13. Connect sterile transfer tubing from reservoir liner to transfer port (top port) at rear of reservoir.	—	—
14. Adjust suction flow to required level (under 400 mm Hg).	—	—
<b>Note.</b> The suction should be just enough to evacuate blood, but not any stronger. Excessive suctioning force will cause hemolysis.		
15. Open anticoagulant line and prime reservoir with 100 cc of anticoagulant. This will prepare the reservoir to accept the salvaged blood.	—	—
16. Adjust anticoagulant drip rate to 1 drop per second. This is a good initial drip rate. The rate may need to be faster for faster bleeding.	—	—
17. Open cell saver pack and hang waste bag on the 3 waste bag support pins.	—	—

## Performance Measures

Go    No Go

**Warning.** Be sure to provide adequate space (about 2 feet) to the left of the Cell Saver to allow room for the 10-liter waste bag to expand as it fills. Failure to provide space may result in the waste bag's hanging up on nearby hardware, thus compromising the safety of the Cell Saver System.

- 18. Remove the reinfusion bag from the tray and hang it on an IV pole opposite the anticoagulant solution. Position the Cell Saver in a location that is convenient to the nurse anesthetist.      — —
- 19. Close 2 red slide clamps on reinfusion bag and make sure that large fill line is open.      — —
- 20. Before inserting the bowl in the chuck of the Cell Saver centrifuge well, inspect the chuck to be certain that it is clean and that there are no foreign particles on the flat face of the chuck cavity. The presence of any particles here may cause poor alignment of the bowl.      — —
- 21. Be sure that the "O" ring in the chuck which grips the periphery of the bowl base has a very light film of silicone grease. Also, be sure that the 3 chuck clamp screws are in the full counterclockwise position (approximately 1/2 turn from the gripping position), so that the clamp ring is not squeezing the "O" ring.      — —

**Note.** To loosen chuck screws, turn counterclockwise; to tighten chuck screws, turn clockwise.

- 22. Without tilting the centrifuge bowl, insert it in the centrifuge chuck, pressing down with both hands until a click is heard, indicating that bowl is seated in the well. Position the bowl so that the lower port points to the control panel and the upper port points to the front of the machine.      — —
- 23. To verify proper seating of the bowl, hold chuck in place with chuck tool and manually rotate centrifuge bowl left and right to check free movement. If the bowl is properly seated, it should turn with little resistance in the chuck. If the bowl does not turn freely, it should be taken out and reinserted until there is free movement.      — —

**Warning.** Do not neglect to check the placement of the bowl in the chuck. An improperly seated bowl could wobble, overheat, or become damaged from friction and compromise the quality of the end product.

- 24. To secure the bowl in the chuck, tighten the 3 chuck screws with the chuck tool while holding the bowl until a distinct click is heard.      — —

Performance Measures	Go	No Go
25. While facing the system, gently press down the header of the bowl and swing the feed tube support arms into position. (The effluent line tubing should be placed over the left support arm.)	—	—
26. Place the cam lock at the 2 o'clock position. Rotate the hook from the other arm against the cam lock. Gently turn the cam lock which should rotate to the 4 o'clock position. Finally, turn the cam lock to the 6 o'clock position. If the camlock does not rotate freely, reposition the arms and repeat the procedure. Do <u>not</u> force the cam lock.	—	—
27. Close centrifuge well cover after threading the shorter (effluent) tubing through the slot in the well rim to the left and the longer pump tubing through the front slot.	—	—
<b>Note.</b> Removal of the bowl is the reverse of installation, but it is necessary to pry the bowl out (after the chuck screws have been loosened) using the square end of the chuck tool.		
<b>Warning.</b> As a safety feature, the Cell Saver is equipped with a pneumatic cover interlock switch which will not allow the centrifuge to run if the cover is not in place. Also, the centrifuge cover is not unlocked until the centrifuge stops spinning. Do <u>not</u> force the cover open or damage to the interlock switch may occur, rendering the machine inoperative.		
28. Remove caps from the waste bag and centrifuge effluent tubing.	—	—
29. Aseptically connect centrifuge bowl tubing to waste bag.	—	—
30. Open pump head and install tubing in pump, with tubing situated between guides located on left and right of the pump and pump door closed.	—	—
31. Firmly seat tubing in air detector and under tubing guide.	—	—
32. Position each of the 3 color-coded lines through the appropriate <u>color-coded</u> clamp. The Pause/Resume button may be used to open and then close the clamps, or this may be done manually.	—	—
33. Close feed tube clamps.	—	—
34. Firmly seat <u>red</u> feed tube on reservoir drain and open drain clamp. This will allow collected blood to be sent to the bowl and processed.	—	—
35. Close both slide clamps on <u>yellow</u> wash lines before spiking either saline wash solution.	—	—
36. Connect 1 or 2 containers of normal saline to the bag spike(s) on the harness.	—	—

Performance Measures	Go	No Go
37. Hang saline bag(s) in a cascade manner on push handle and lower IV pole solution bag holder.	—	—
38. Open slide clamps on saline wash lines.	—	—
<b>Warning.</b> Open the slide clamps immediately after spiking the wash containers. If the wash line slide clamps are not opened, the Cell Saver will produce an unwashed blood product which will have high concentrations of plasma-free hemoglobin, extracellular potassium, and anticoagulant. Infusion of such a blood product would be harmful to the patient.		
39. Firmly seat <u>blue</u> line in reinfusion bag connection.	—	—
40. Open big slide clamp on the <u>blue</u> reinfusion line.	—	—
41. Check that the Cell Saver has been set up correctly as follows:		
a. Carefully recheck the mounted harness to make certain that each section is in the correct position on the Cell Saver and that all tubes are free of twists, kinks, or flat spots. It is particularly important that no occlusion remain in the tube between the bowl and the reinfusion bag when blood is being pumped out of the bowl.	—	—
b. Fully seat all connections, making sure that there are no loose connections.	—	—
c. Open and close all slide clamps appropriately.	—	—
d. Route tubing in appropriate feed tube clamps.	—	—
e. Route tubing through roller pump and air detector without twists.	—	—
OVERALL EVALUATION	—	—

### **Additional Practical Exercise:**

#### **Conditions**

The trainer administers this practical exercise by stating, "Here is a Blood Recovery and Delivery System that has been set up with several deficiencies. Each of the deficiencies would prevent the safe and effective use of the equipment. Identify and correct the deficiencies." You have the following equipment and supplies: 1 Blood Recovery and Delivery System set up with the following deficiencies: Bottom 2 corners of sterile collection liner not secured; autotransfusion reservoir door closed but handle not locked, top clamp rotated up, & bottom clamp rotated down; centrifuge bowl seated loosely in well & screws not tightened; feed tube support arms not locked in place; tubing lying loosely by open pump head; tubing not threaded through air detector; red & blue tubes reversed in position; red & blue tubes not connected to any bag; normal saline bag connected to anticoagulant tubing, but bag not labeled as having an anticoagulant added.

#### **Standards**

Identify and correct each of the deficiencies that would prevent the safe and effective use of the Haemonetics Cell Saver 4 Autologous Blood Recovery System IAW the references.

<b>Performance Measures</b>	<b>Go</b>	<b>No Go</b>
1. Identify that the sterile collection liner is not properly secured in the autotransfusion reservoir. Secure collection liner at all 4 corners of the reservoir.	—	—
2. Identify that the autotransfusion reservoir door is not completely closed. Secure reservoir door closed with the handle locked forward, the top clamp rotated down, & the bottom clamp rotated up.	—	—
3. Identify that the centrifuge bowl is not securely seated. Install centrifuge bowl. (A click will indicate that the bowl is seated in the well.) Hold chuck in place with chuck tool and rotate bowl left & right to check free movement. Tighten 3 chuck screws. (Screws are tight when the chuck tool gives a distinct click.)	—	—
4. Identify that the feed tube support arms are not locked in place. Lock left & right feed tube support arms in place with hook. Rotate cam lock to the 6 o'clock position. Close centrifuge cover.	—	—
5. Identify that tubing is not properly threaded through the pump head. Open pump head & install tubing between the guides located on the left and right of the pump. Close the pump head.	—	—
6. Identify that tubing is not properly threaded through the air detector. Firmly seat the tubing in the air detector & under the tubing guide.	—	—

Performance Measures	Go	No Go
7. Identify that the red & blue tubes are reversed in position. Install red & blue feed tubes in appropriate color-coded clamps. Close feed tube clamps.	—	—
8. Identify that the red & blue tubes are not connected to any bag. Connect red tube to the reservoir drain. Connect blue tube to the reinfusion bag connection.	—	—
9. Identify that the normal saline bag is not marked as having an anticoagulant added. Verbalize that the anticoagulant should be added & the bag should be labeled.	—	—
10. Verbalize that 30,000 units of Heparin normally is added for each 1 liter of normal saline in the bag.	—	—
<b>OVERALL EVALUATION</b>	—	—

#### References

Haemonetics® Corporation. (1987). Haemonetics® Cell Saver® 4 autologous blood recovery system: Owner's operating and maintenance manual (Rev. C). Braintree, MA: Author.

Haemonetics® Corporation. (1988). Haemonetics® Cell Saver® 4 service manual (NSN 6515-01-240-6883; Rev. B). Braintree, MA: Author.

U.S. Army Medical Matériel Agency. (n.d.). Blood recovery and delivery system: Maintainer training guide (NSN 6516-01-240-6883). Fort Detrick, MD: Author.

U.S. Army Medical Matériel Agency. (n.d.). Blood recovery and delivery system: Operator training guide (NSN 6516-01-240-6883). Fort Detrick, MD: Author.

U.S. Army Medical Matériel Agency. (n.d.). Blood recovery and delivery system: Supervisor evaluation guide (NSN 6516-01-240-6883). Fort Detrick, MD: Author.

## **1.14: Operate a Blood Recovery and Delivery System (66F)**

### **Introduction:**

This task summary describes operation of the Haemonetics Cell Saver 4 Autologous Blood Recovery System (NSN 6516-01-240-6883). (See Task 1.13, *Set Up a Blood Recovery and Delivery System*, for information regarding the set up of the Cell Saver.) The nurse anesthetist (66F) has been designated as the responsible individual for operation of the Blood Recovery and Delivery System (Cell Saver) in a field environment (DMSB, 1994). The operating room nurse (66E) also has played an active role in the operation of the Cell Saver in selected US Army MTFs.

The following information is taken from the USAMMA training materials (which are accompanied by training videotapes) and the manufacturer's operating, maintenance, and service manuals listed in the reference section. These materials should be consulted when planning and conducting training. Remember that safe and effective use of the Cell Saver requires the application of proper techniques of setup and operation and should be undertaken only by trained personnel.

The manufacturer's operating and maintenance manual notes that (a) use of the Cell Saver with Betadine or Avitene is contraindicated and (b) use of reinfused blood from the Cell Saver may be contraindicated in the case of sepsis or malignancy. Although sepsis or fecal contamination generally are considered contraindications to use of the Cell Saver, some physicians--preferring to treat sepsis over rigor mortis--use the Cell Saver in life or death situations. Use of the Cell Saver is always at the discretion of the physician. (See Appendix G ("Common Questions and Answers") in *Haemonetics® Cell Saver® 4 autologous blood recovery system: Owner's operating and maintenance manual* for further information.)

### **Task Summary:**

#### **Conditions**

You are responsible for the operation of the Haemonetics Cell Saver 4 Autologous Blood Recovery System (Cell Saver) during the next case. You have the following equipment and supplies: 1 Haemonetics Cell Saver 4 Autologous Blood Recovery System (NSN 6516-01-240-6883) with all disposable items installed IAW operator's instructions; 2 bags of Sterile Normal Saline solution (1 or 3 liter bags); a supply of blood that can be used for training (optional); an assembled intermittent suction-aspirator system (NSN 6515-01-267-2726 or NSN 6515-01-267-2727).

#### **Standards**

You must demonstrate your knowledge of safely and effectively preparing the Haemonetics Cell Saver 4 Autologous Blood Recovery System (Cell Saver) for blood collection, processing blood in the automatic mode, and removing processed blood from the system IAW the references.

Performance Measures	Go	No Go
1. Prepare the Cell Saver for blood collection as follows:		
a. Check that disposable items have been assembled on the Cell Saver IAW operator's instructions and using aseptic technique.	—	—
<b>Warning.</b> Never operate the Cell Saver when the bowl appears to wobble severely, turn with severe eccentricity, or be improperly aligned. If the bowl is allowed to operate while not properly aligned, the stationary and rotating parts of the bowl's seal will cause abnormal friction. The friction may also generate enough heat to cause hemolysis. If these conditions occur, the blood being processed cannot be regarded as appropriate for reinfusion.		
<b>Warning.</b> Avoid blocking any tubing carrying blood from the pump. A buildup of pressure in this tubing can result in the wide dispersal of blood. Observe the waste bag to verify that the accumulation of air in the air/waste bag is not being prevented by either a flow restriction or an air leak.		
b. Check that the anticoagulant solution consists of a 1,000 ml bag of normal saline (0.9%) with 30,000 units of heparin.	—	—
c. Turn suction on suction aspirator system to a minimum acceptable flow (100 mm Hg) - noting that if flow exceeds 400 mm Hg, destruction of red blood cells could occur.	—	—
d. Open anticoagulant line to prime sterile collection reservoir with approximately 100 cc solution.	—	—
e. Regulate the anticoagulant drip rate to 1 drop per second.	—	—
2. Process blood using the Cell Saver in automatic mode as follows:		
a. When asked, state that collection of 600-900 ml of blood is required before beginning to process blood - noting that processing blood with less than 600-900 ml will produce a product with less than the desired hematocrit and will compromise the blood being returned to the patient.	—	—
b. Initiate autoprocessing of blood from the reservoir using the START/AUTO button.	—	—
c. When asked, state that reinfusion can begin when 2 inches of blood enters the reinfusion bag.	—	—
d. When told to discontinue all processing, press the STOP button.	—	—
e. Given the requirement to begin processing again, press the PAUSE/RESUME button.	—	—

Performance Measures	Go      No Go
f. Given the requirement to concentrate processed blood upon receiving the RESERVOIR EMPTY message, press the FINAL CYCLE button used to concentrate blood.	— —
g. The operator should feel the chuck with his hand to detect any evidence of overheating each time a bowl is removed at the end of a procedure. If any portion of the upper surface of the chuck is found to be above 98.6°F, the machine should be serviced before further use.	— —
<b>Warning.</b> If, during a procedure, it is discovered that any portion of the equipment within proximity of the blood has been significantly overheated, the processed red cells should be regarded as unsafe for reinfusion.	
3. Remove processed blood from the Cell Saver for storage or continued patient reinfusion in the recovery area as follows:	
a. Close red slide clamps on reinfusion bag.	— —
b. Lower reinfusion bag below level of centrifuge bowl with ports facing up.	— —
c. Open pump door and manually open blue line pinch valve allowing blood to drain to reinfusion bag.	— —
d. Close roller pump.	— —
e. Press REMOVE AIR button and hold it down until red cells begin to exit the reinfusion bag.	— —
f. Close white clamp on reinfusion bag.	— —
g. Disconnect reinfusion bag from system.	— —
<b>Warning.</b> The blue harness line comes primed with 80 ml of air from the factory. At the first EMPTY mode, this air is sent into the reinfusion bag. Therefore, it is important that the operator does not use a pressure cuff with the Cell Saver. Pressure reinfusion can result in the fatal infusion of air.	
<b>Warning.</b> Washed, packed cells are depleted of clotting factors. The physician must monitor the quantity of washed cells returned to the patient and supplement the washed, packed cells with fresh frozen plasma and platelets if required for hemostasis.	
<b>OVERALL EVALUATION</b>	— —

### **Written Exercises:**

1. List 3 surgical procedures during which a Blood Recovery and Delivery System can be used in a field environment.
2. Describe 2 patient conditions that are normally considered contraindications to use of the Blood Recovery and Delivery System.
3. What can happen if the centrifuge bowl is allowed to operate while not properly aligned?
4. What can happen if the centrifuge bowl outlet port is clamped off?
5. Why should the Cell Saver never be used with a reinfusion pressure cuff?
6. Why must the physician monitor and supplement the quantity of washed, packed cells returned to the patient?

### **References**

- DMSB. (1994). DEPMEDS administrative procedures and clinical and support guidelines (3rd ed. draft). Fort Detrick, MD: Author.
- U.S. Army Medical Matériel Agency. (n.d.). Blood recovery and delivery system: Maintainer training guide (NSN 6516-01-240-6883). Fort Detrick, MD: Author.
- U.S. Army Medical Matériel Agency. (n.d.). Blood recovery and delivery system: Operator training guide (NSN 6516-01-240-6883). Fort Detrick, MD: Author.
- U.S. Army Medical Matériel Agency. (n.d.). Blood recovery and delivery system: Supervisor evaluation guide (NSN 6516-01-240-6883). Fort Detrick, MD: Author.
- Haemonetics® Corporation. (1987). Haemonetics® Cell Saver® 4 autologous blood recovery system: Owner's operating and maintenance manual (Rev. C). Braintree, MA: Author.
- Haemonetics® Corporation. (1988). Haemonetics® Cell Saver® 4 service manual (NSN 6515-01-240-6883; Rev. B). Braintree, MA: Author.

## **1.15: Operate an 885A Field Anesthesia Apparatus (66F)**

### **Introduction:**

This task summary describes operation of the Ohmeda 885A military field anesthesia machine (NSN 6515-01-185-8446), which is designed for the administration of an inhaled anesthetic by rebreathing circle or partial rebreathing "Mapleson" circuits (Ohmeda, 1986). It is designed for use with compressed oxygen and nitrous oxide provided by small (D or E size) or large (H or M size) cylinders. The agent nonspecific, non-temperature compensated vaporizer can be used with all common potent liquid anesthetic agents except desflurane.

The Ohmeda 885A incorporates minimal safety mechanisms. The most important safety mechanism is the anesthetist's vigilance. Delivery of a hypoxic mixture of nitrous oxide is easily accomplished with this apparatus. Complete understanding regarding the setup, checkout, and performance of vaporizer calculations is essential to the safe operation of the Ohmeda 885A.

Consult the listed references for further information regarding operation of the 885A field anesthesia apparatus. Also, consult your nearest US Army Visual Information (VI) library for the training videotape, "Setup and Use of the Military Field Anesthesia Machine" (Program Identification Number 503005DW).

### **Task Summary:**

#### **Conditions**

You are in a field environment and are checking your field anesthesia equipment. You have been asked to set up the 885A field anesthesia apparatus and ensure its safe and effective use for the adult and pediatric patients you are about to receive. You have the following equipment and supplies: An 885A anesthesia apparatus (NSN 6515-01-185-8446) in its carrying case; an 885A anesthesia apparatus set up with 4 deficiencies that would prevent its safe and effective use; a pediatric partial rebreathing circuit; an Ohmeda 7000 anesthesia ventilator (NSN 6515-01-116-7903); 2 "D" oxygen cylinders, 1 "E" oxygen regulator with a green oxygen connector; 1 Ohmeda positive end expiratory pressure valve (PEEP valve); 1 Ohmeda 5120 oxygen monitor (NSN 6515-01-279-6450); 1 "H" oxygen cylinder, 4 CO<sub>2</sub> absorption canisters; an electrical source; 1 flow calculator.

#### **Standards**

Assemble a functional 885A anesthesia apparatus and describe its safe and effective use with adult and pediatric patients IAW the references.

Performance Measures	Go	No Go
1. Assemble a fully functional anesthesia system utilizing an adult rebreathing system as follows:		
a. Raise control head to full and upright position. Secure with hinged thumb bolt.	—	—
b. Attach the oxygen analyzer monitor.	—	—
c. Assemble and attach adult breathing circuit.	—	—
d. Secure two (2) "D" oxygen cylinders to holder behind oxygen flowmeter.	—	—
e. Momentarily open oxygen cylinders, blowing clean the outlets.	—	—
f. Mount pressure regulators to cylinders.	—	—
g. Connect short supply hose to pressure regulator and oxygen gas supply inlet.	—	—
h. Establish waste gas evacuation system using hoses supplied.	—	—
i. Establish oxygen flow to the adult rebreathing circuit.	—	—
2. Describe how to fill, drain, and activate the vaporizer as follows:		
a. Describe the ON and OFF control settings.	—	—
b. Describe filling procedure.	—	—
c. Describe draining procedure.	—	—
3. Establish a second oxygen source from the "H" oxygen cylinder to the .885A anesthesia apparatus as follows:		
a. Locate regulator, large tank adaptor, and long tubing.	—	—
b. Attach regulator to cylinder.	—	—
c. Connect cylinder to oxygen gas supply inlet.	—	—
4. Perform a pre-use check-out of the 885A anesthesia apparatus as follows:		
a. Verify oxygen flow through oxygen flow meter (metabolic).	—	—
b. Verify oxygen flow through vaporizer oxygen flow meter.	—	—
c. Check inhalation and exhalation check valves.	—	—
d. Perform leak test to assess regulator integrity.	—	—
e. Perform leak test to assess flowmeter integrity.	—	—

Performance Measures	Go	No Go
f. Perform leak test to assess APL integrity and ability to deliver positive pressure.	—	—
g. Demonstrate oxygen monitor calibration.	—	—
5. Describe the procedure for changing from a large to a small tank oxygen source during use of the 885A anesthesia apparatus.	—	—
6. Describe the correct utilization of the vaporizer and the flow calculator.	—	—
7. Set up a ventilator to the 885A anesthesia apparatus as follows:		
a. Establish a 50 psi oxygen source.	—	—
b. Establish an electrical power source.	—	—
c. Establish a waste gas evacuation hose.	—	—
8. Connect a ventilator to an 885A anesthesia apparatus as follows:		
a. Install a ventilator-bag diverter valve.	—	—
b. Connect a ventilator delivery hose and breathing bag to diverter valve.	—	—
c. Connect a low pressure sensor to breathing circuit.	—	—
d. Ventilate a test lung with the system.	—	—
9. Convert the adult rebreathing system to a pediatric partial rebreathing circuit as follows:		
a. Assemble the pediatric partial rebreathing circuit.	—	—
b. Establish gas flow to the circuit.	—	—
c. Establish a waste gas evacuation hose.	—	—
d. Perform leak test to assess ability to deliver positive pressure.	—	—
e. Perform waste gas evacuation test to assess scavenging ability.	—	—
10. Identify and explain how to correct deficiencies that are in an 885A anesthesia apparatus that would prevent its safe and effective use as follows:		
a. Loose canister.	—	—
b. Large leak in breathing circuit.	—	—
c. Missing exhalation check valve leaflet.	—	—

Performance Measures	Go	No Go
d. Protective closure device has not been removed from the inspiratory outlet.	<hr/>	<hr/>
<b>OVERALL EVALUATION</b>	<hr/>	<hr/>

**Written Exercises:**

Circle the correct answer for each of the following questions.

1. TRUE or FALSE: Nitrous Oxide is supplied as part of TOE deployable medical supplies.
2. Waste gas lines are to be established when utilizing the 885A.  
These lines can be established using:
  1. the hospital supplied vacuum system
  2. a passive evacuation system
  3. a suction device in the OR for removing irrigation fluids
  4. an active evacuation system
  - a. 1, 2, 3
  - b. 1, 3
  - c. 2, 4
  - d. 4 only
  - e. all are correct
3. The cylinder regulator assembly includes:
  1. a pin-index system
  2. pressure gauge
  3. relief valve
  4. quick coupler indexed check valve
  - a. 1, 2, 3
  - b. 1, 3
  - c. 2, 4
  - d. 4 only
  - e. all are correct
4. The ball-float in the flowmeter is read at:
  - a. the top of the ball
  - b. the middle of the ball
  - c. the bottom of the ball

5. Using which gas law allows you determine the volume of gas available in a compressed gas cylinder?
  - a. Herny's
  - b. Charles'
  - c. Dalton's
  - d. Graham's
  - e. None of the above
6. The pressure gauge on the E-cylinder registers 1650 psi. The full cylinder contained 165 gallons of oxygen. How many gallons remain in this cylinder?
  - a. 125
  - b. 80
  - c. 132.5
  - d. 82.5
  - e. 110
7. Using the answer obtained in Question 6, for how many hours could you deliver a 5 liter/min flow rate?
  - a. 1.5
  - b. 0.5
  - c. 1.0
  - d. 2.0
  - e. 2.5
8. TRUE or FALSE: The 885A Anesthesia Apparatus possesses a "Fail-safe" mechanism.
9. The vaporizer on the 885A is \_\_\_\_\_ compensated.
  - a. Temperature
  - b. Flow
  - c. Pressure
  - d. All of the above
  - e. None of the above
10. TRUE or FALSE: Once the initial unpacking of the 885A has occurred, all of the component parts can never be repacked into the storage case.

### **Answers to the Written Exercises**

1. False

3. e

5. e

7. a

9. e

2. c

4. b

6. a

8. True

10. False

### **References**

HQDA. (1990). Unit, direct support, and general support maintenance manual: Anesthesia apparatus (TM 8-6515-001-24&P). Washington, DC: Author.

Ohmeda. (1986). Model 885 Conversion Anesthesia apparatus, gas, nitrous oxide, oxygen and volatile liquid anesthetics, portable 4 cylinder capacity: Instruction and service manual with illustrated parts list (NSN 6515-01-185-8446). Madison, WI: Author.

## **1.16: Operate a Universal PAC Draw-Over Anesthesia Apparatus (66F)**

### **Introduction:**

This task summary describes operation of the Universal PAC Draw-Over Vaporizer, which has been specially developed for military battlefield use. It is designed to be used over the range of minute volumes normally encountered in draw-over anesthesia with intermittent flows, with ambient air or in non-rebreathing demand systems (Ohmeda, 1990). A non-return valve is incorporated to minimize the possibility of rebreathing across the vaporizer.

The vaporizer is temperature compensated, low resistance, non-spill and is primarily designed for use with either Isoflurane or Halothane.

The use of supplemental oxygen is strongly recommended whenever the Ohmeda Universal PAC is used. Failure to use supplemental oxygen may cause hypoxemia, especially during spontaneous breathing or controlled ventilation.

### **Task Summary:**

#### **Conditions**

You are in a field environment and are checking your field anesthesia equipment. You have been asked to set up a Universal PAC Draw-Over anesthesia apparatus and ensure its safe and effective use for patients you are about to receive. You have the following equipment and supplies: A complete Universal PAC Draw-Over anesthesia apparatus in its carrying case and a low pressure oxygen source with a L/M control valve.

#### **Standards**

Assemble a functional Universal PAC Draw-Over anesthesia apparatus and describe its safe and effective use IAW references.

#### **Performance Measures**

**Go      No Go**

1. Assemble a fully functional Universal PAC Draw-Over anesthesia system utilizing a non-rebreathing adult circuit as follows:
  - a. Assemble an adult non-rebreathing circuit. \_\_\_\_\_
  - b. Position an oxygen monitor. \_\_\_\_\_
  - c. Attach a low pressure oxygen source to supplemental fitting. \_\_\_\_\_
  - d. Establish a waste gas evacuation hose. \_\_\_\_\_

Performance Measures	Go	No Go
2. Configure the Universal PAC vaporizer for isoflurane use as follows:		
a. Secure the isoflurane agent concentration dial.	—	—
b. Describe use of the vaporizer with enflurane.	—	—
c. Describe use of the vaporizer with halothane.	—	—
d. Describe the filling procedure.	—	—
e. Describe the draining procedure.	—	—
3. Perform a pre-use check-out of the Universal PAC Draw-Over anesthesia apparatus as follows:		
a. Demonstrate the flow of gas through the vaporizer	—	—
b. Perform internal leak vacuum test assessing integrity of one-way valves.	—	—
c. Perform external leak test assessing ability to deliver positive pressure.	—	—
d. Check for proper function of one-way valves at E-valve assembly.	—	—
e. Demonstrate oxygen monitor calibration.	—	—
4. Utilize a Universal PAC vaporizer as follows:		
a. Describe how the amount of liquid agent in the universal PAC vaporizer is monitored.	—	—
b. Demonstrate the delivery of 1% and then 3% isoflurane.	—	—
c. Describe how the delivered percentage of oxygen is a function of the oxygen flow and the patient's minute volume. For example: If the oxygen supplemental flow is 2 L/min. & the patient's minute volume of ventilation is doubled, what happens to the percentage of inspired oxygen?	—	—
OVERALL EVALUATION	—	—

**Written Exercises:**

1. Is the vaporizer performance (i.e., the amount of vapor reaching the patient) affected by the supplemental oxygen flow rate?
2. How does tilting the vaporizer during use affect its performance?
3. How are internal leaks discovered during the pre-use checkout?

**References**

Condon, B. C., et al. (1991). Anesthesia guidelines. In R. Zajtchuk, D. P. Jenkins, R. F. Bellamy, C. M. Quick, & C. C. More (Eds.), Combat casualty care guidelines: Operation desert storm (pp. 25-26). Washington, DC: Office of The Surgeon General.

Ohmeda. (1990). Ohmeda Universal PAC: Operation and maintenance manual. West Yorkshire, England, U.K.: Author.

### **Answers to the Written Exercises**

1. No, vaporizer performance is not affected by supplemental oxygen flow rate. The FIO<sub>2</sub> is increased but the amount of vapor reaching the patient is the same.
2. Performance is not affected. The vaporizing chamber is arranged so that the free liquid cannot pour into the breathing circuit.
3. First, turn on the vaporizer. Second, squeeze the self-inflating bag and hold it in this condition. Third, cap the air inlet and the oxygen nipple and then release the self-inflating bag. If the bag does not then re-inflate, there are no significant leaks.

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**B. Skills Performed Without Automated Equipment  
or Specialized Support Services**

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**2.01: Measure CVP Using a Water Manometer System  
(66H, 66F)****Introduction:**

This task summary describes measurement of the central venous pressure (CVP) using a water manometer system (e.g., Pharmaseal Cat. No. 4338A). CVP monitoring refers to measurement of right atrial pressure or the pressure of the great veins within the thorax (Suddarth, 1991). CVP monitoring requires the threading of a catheter into a large central vein (subclavian, internal/external jugular, median basilic, or femoral). The catheter tip is positioned in the upper portion of the superior vena cava or the inferior vena cava (femoral approach only). Two purposes of CVP monitoring are to monitor pressures in the right atrium and central veins and to serve as a guide for fluid replacement.

When a patient's blood volume falls due to extensive hemorrhaging, he maintains the volume of blood in his arteries at the expense of that in his veins. One of the first signs of a low blood volume is a low CVP. A rise in his pulse rate and a fall in his arterial blood pressure are later signs of hypovolemia. Measuring the CVP is thus of value in treating the hypovolemic shock that may follow a severe injury (King, 1986).

**Task Summary:****Conditions**

You are providing patient care in a field environment and need to obtain an intermittent central venous pressure (CVP) reading on a patient who has a central venous line. You have the following equipment and supplies: CVP monitor, Pharmaseal Cat. No. 4338A, unassembled; 1 liter bag of IV fluid with IV tubing; 1 small basin; IV pole; 1 mannequin on a hospital bed.

**Standards**

Correctly assemble and position a water manometer system and obtain an intermittent CVP reading IAW the references.

Performance Measures	Go	No Go
1. Maintain aseptic technique throughout the procedure.	—	—
2. Prepare IV administration set-up, priming tubing with IV solution and making certain that no air bubbles are present in tubing. Close clamp on tubing.	—	—
3. Secure manometer on IV pole.	—	—
4. Connect IV administration set to manometer.	—	—
5. Turning stopcock so that manometer and IV solution are open to each other, open clamp on IV tubing and fill manometer with IV solution to between 18 and 20 cm.	—	—
<b>Note.</b> Overfilling the manometer may expose the patient to contamination resulting from overflow.		
6. Close clamp and rotate stopcock so that IV solution is open to patient.	—	—
7. Prime IV fluid path to the patient and connect tubing to IV catheter.	—	—
8. Place patient flat in bed without a pillow if possible. If not, raise head of bed 15°-30°. Use same position each time a CVP reading is made.	—	—
9. Locate patient's right atrium (midaxillary line at fourth intercostal space).	—	—
10. Adjust level of manometer so that zero on manometer scale is the same level as patient's right atrium.	—	—
11. Turn stopcock to open position for manometer-IV solution, filling manometer with additional solution as needed to a level slightly above expected reading.	—	—
12. Turn stopcock to the manometer-patient position and watch the level of the solution in the manometer fall to the pressure level existing in the right atrium.	—	—
<b>Note.</b> Changes in the CVP readings over time are more important than one pressure level reading.		
13. Observe meniscus at eye level and watch rise and fall of fluid column in response to patient's breathing.	—	—
<b>Note.</b> Respiratory fluctuations reflect changes in intrathoracic pressures during respiratory cycle and indicate that manometer is functioning properly.		
14. When equilibrium is reached, take CVP reading at highest level of meniscus and at end of expiration. This is an intermittent CVP reading.	—	—
15. Reset stopcock so that IV flow is from solution bag to patient. Adjust rate of infusion as prescribed.	—	—

Performance Measures	Go      No Go
Note. For continuous CVP readings, turn stopcock so that all 3 ports are open. Readings during continuous monitoring are higher than intermittent readings because of added pressure from the solution bottle. However, this difference is constant for a given catheter and infusion rate. Thus, at a constant infusion rate, the changes in CVP can be accurately measured.	
16. Return patient to desired position and record CVP reading.	— —
OVERALL EVALUATION	— —

**Written Exercises:**

1. Describe one indication for obtaining a CVP measurement on a casualty in a field environment.
  
  
  
  
2. Describe the appropriate patient position for obtaining a CVP measurement.
  
  
  
  
3. Explain the differences between a continuous and an intermittent CVP reading.

References
American Pharmaseal Company. (1986). <u>Pharmaseal® procedure set-up: Central venous pressure monitor</u> . Valencia, CA: Author.
King, M. H. (Ed.) (1986). <u>Primary anaesthesia</u> . New York: Oxford University Press.
Smith, S. F., & Duell, D. J. (1992). <u>Clinical nursing skills</u> (3rd ed.). Norwalk, CT: Appleton & Lange.
Suddarth, D. S. (Ed.). (1991). <u>Lippincott manual of nursing practice</u> (5th ed.). Philadelphia: J. B. Lippincott.

## **2.02: Measure a Patient's Oral Temperature (66H, 91B, 91C)**

### **Introduction:**

This task summary describes measurement of a patient's oral temperature using a mercury-in-glass thermometer. Body temperature is the result of a balance between the heat produced and the heat lost by the body. A mercury-in-glass thermometer is used for this skill because the equipment and disposable supplies required for automated methods of temperature-taking are not always available in a field environment.

Taking an oral temperature is the most convenient method of measuring a patient's temperature and can be used for responsive adult patients. Taking an oral temperature using a glass thermometer is contraindicated for unconscious, irrational, and seizure-prone patients, and for infants and young children because of the possibility of breaking the glass thermometer in the mouth. Taking an oral temperature is also contraindicated for patients who have had surgery of the nose or mouth.

The normal, or average, oral temperature of most individuals is 98.6° F. A range of 0.5 to 1.0°F from the average temperature is usually considered to be within normal limits, but wider variations from the average temperature are normal for certain individuals.

### **Task Summary:**

#### **Conditions**

You are in a field environment and need to measure a patient's oral temperature. You have the following equipment and supplies: 1 oral and 1 rectal thermometer, each in a separate container labeled for clean thermometers (but not labeled for oral or rectal thermometers); another thermometer that can be used to test reading a thermometer; 1 container designated for dirty thermometers; 1 box of sterile alcohol pads; 1 table.

#### **Standards**

Demonstrate the procedures for measuring a patient's oral temperature with a mercury-in-glass thermometer and for cleaning the thermometer between patient use IAW the references.

Performance Measures	Go	No Go
1. Choose a clean oral thermometer.	—	—
<b>Note.</b> The clinical thermometer is a glass bulb containing mercury and a stem in which the mercury can rise. On the stem, there is a graduated scale representing degrees of temperature, with the lowest indicating 94°F or 96°F. The thermometer tip is commonly color-coded for proper identification: Blue tip for oral usage and red tip for rectal usage. The standard rectal thermometer comes in two shapes that are designed to prevent perforation of the anus or rectum.		
2. If the thermometer has been stored in a chemical solution, wipe it dry with a firm, twisting motion, using a clean, soft tissue.	—	—
3. Grasp the stem end of the thermometer firmly with the thumb and forefinger, and with a sharp downward wrist motion, shake the thermometer to lower mercury below 94°F (or below the lowest degree of temperature marked on the scale).	—	—
4. Place bulb end of the thermometer well within the back of the right or left heat pocket under the patient's tongue and check that the patient closes his lips firmly around the stem without biting down.	—	—
<b>Note.</b> When the bulb rests well within the posterior sublingual heat pocket, it is in contact with blood vessels lying close to the surface and thus can give an accurate measure of body temperature.		
<b>Note.</b> Before taking an oral temperature you should ask the patient if he has recently had any food or drink or if he has been smoking. If so, wait 15 minutes before taking the temperature.		
5. Leave the thermometer in place for at least 3 minutes or IAW unit SOP.	—	—
6. Remove thermometer and wipe with a clean, soft tissue from stem to bulb to remove any saliva.	—	—
7. Read and record the temperature in agreement with the trainer as follows:		
a. Hold thermometer by stem at eye level.	—	—
b. Notice ridge side with numbers below and lines indicating number of degrees above (long lines = one degree; short lines = 0.2 degrees).	—	—
c. Rotate thermometer back and forth slowly until you can see silver mercury strip.	—	—
d. Compare mercury strip level to printed markings.	—	—
e. Record the temperature to the nearest tenth.	—	—

Performance Measures	Go	No Go
8. Place thermometer in "contaminated" or "dirty" oral thermometer holder. Use appropriate method of disinfecting patient thermometer between patient use IAW unit SOP.	—	—
9. Combat medics may have to modify the method of disinfecting thermometers while on field maneuvers. A field expedient method of caring for thermometers is as follows:		
a. Remove thermometer from its plastic holder.	—	—
b. Cleanse thermometer with 70% isopropyl alcohol pad. Use a twisting motion to clean from stem to bulb end.	—	—
c. Rinse the thermometer with cool water or with a gauze pad saturated with water. Use a twisting motion from stem to bulb end.	—	—
d. Shake down thermometer to at least 94°F as described above.	—	—
e. Use this procedure both prior to taking patient's temperature and after temperature is taken.	—	—
OVERALL EVALUATION	—	—

#### Written Exercises:

1. Describe the temperature measuring scale on the oral mercury-in-glass thermometer.
2. You should shake the thermometer down to what point before measuring a patient's temperature?
3. What should you do if a patient has just had something to eat or drink and you are ready to take his temperature?
4. Describe a field expedient method of cleaning a thermometer.

#### References

- HQDA. (1984). Field manual: Medical specialist (FM 8-230, pp. 14-1 to 14-6). Washington, DC: Author.
- HQDA. (1988). Soldier's manual: CMF 91 general medical tasks (STP 8-91-SM, Task 081-831-0013). Washington, DC: Author.
- Taylor, C., Lillis, C., & LeMone, P. (1993). Fundamentals of nursing: The art and science of nursing care (2nd ed.). Philadelphia: J. B. Lippincott.

## **2.03: Measure a Patient's Blood Pressure (66H, 91B, 91C)**

### **Introduction:**

This task summary describes measurement of a patient's blood pressure (BP) with a sphygmomanometer and stethoscope. BP can be defined as the force of the blood against the walls of the arteries. By measuring the BP, you obtain information about the effectiveness of the heart contractions, the adequacy of the blood volume in the system, and the presence of any obstruction or interference of flow through the blood vessels. Blood pressure readings measure pressures taken at two phases of the cardiac cycle: Systole and diastole. Blood pressure commonly is reported as a systolic value over a diastolic value. Normal ranges are 100/60 to 140/90.

The obstructing blood pressure cuff causes turbulence of blood that produces Korotkoff sounds. These sounds correlate with the systolic and diastolic phases of the cardiac cycle and thus serve as markers for blood pressure measurement. The World Health Organization (WHO) and the American Heart Association (AHA) recommend the accurate reading of the systolic, first diastolic, and second diastolic pressures, which are described in the following task summary.

Because many factors influence BP, the finding of an isolated elevated BP is not necessarily significant. Patients with a BP reading near or above the upper limits of normal should be reexamined periodically to determine if the elevated measurement persists. Following are some of the factors which influence BP in normal, healthy adults:

- Gender            - Women tend to have a lower BP than men.
- Time of day      - BP is usually lowest on arising in the morning.
- Activity          - BP rises during exercise or strenuous activity.
- Emotions         - Emotions such as anger, fear, excitement, and pain generally cause the BP to rise.
- Position          - A patient's BP tends to be lower when he is in a prone or supine position than when he is sitting or standing.

### **Task Summary:**

#### **Conditions**

You are in a field environment and need to measure a patient's blood pressure (BP). You have the following equipment and supplies: A sphygmomanometer (which includes an aneroid or mercury pressure manometer, an adult-size occlusive cloth cuff that encloses an inflatable rubber bladder, a pressure bulb with release valve to inflate the cuff); 1 professional dual training stethoscope; 1 box of sterile alcohol pads; 1 table; and 2 chairs. (Note that a dual training stethoscope can be made by using a small connector to attach appropriate pieces of 2 stethoscopes.)

### **Standards**

Obtain a systolic and diastolic BP within a tolerance of  $\pm 4$  mm Hg and using procedure IAW the references.

**Note.** A double stethoscope should be used, allowing a tolerance of  $\pm 4$  mm Hg. If other methods are used, such as independent measurements on different sites or at different times, the trainer must apply discretion in applying the  $\pm 4$  mm Hg standard. Allow the soldier to retake the blood pressure at least once. Use discretion in allowing additional repetitions based on the difficulty of obtaining a reading on the patient.

### **Performance Measures**

**Go      No Go**

1. Prepare the equipment as follows:

a. Select a BP cuff of an appropriate size for the patient as follows:

- (1) The width of the cuff should be 20% greater than the width of the measured extremity.
- (2) The length should be sufficient to encircle the measured extremity.

**Note.** The average dimensions of the bladder for an adult BP cuff are 13 cm wide by 24 cm long.

**Note.** A falsely elevated BP reading can be obtained with a cuff that is too narrow, and a falsely low reading can be obtained with a cuff that is too wide.

b. Deflate cuff completely and fully re-tighten thumbscrew.

c. Make sure that the sphygmomanometer gauge reads zero as follows:

- (1) Make sure that a mercury manometer is in a vertical position and that the mercury is in the zero area with the gauge at eye level.
- (2) If using an aneroid gauge, make sure the needle is within the zero mark.

d. Decontaminate the stethoscope. Clean earpieces and diaphragm with 70% alcohol swabs and cotton-tipped applicators as needed.

2. Prepare the patient as follows:

a. Explain the procedure to the patient.

b. Select an unimpaired arm (e.g., no IV infusion, cast, injured or diseased limb) for application of the cuff.

Performance Measures	Go	No Go
c. Position the patient in a comfortable lying or sitting position with his forearm supported at heart level and the palm of his hand turned upward.	—	—
d. Expose upper arm fully without constricting the arm from a rolled sleeve.	—	—
<b>Note.</b> If injured, the patient should not be moved simply for the purpose of determining the BP if doing so may aggravate existing injuries.		
3. Position cuff and manometer as follows:		
a. Place the cuff so lower edge is 1-2 inches above the elbow and center of bladder is directly over the brachial artery (medial aspect of arm). The tubing should extend from the edge of the cuff near the patient's elbow.	—	—
b. Wrap cuff around arm smoothly and snugly and fasten securely.	—	—
c. If using aneroid-type manometer, clip gauge to cuff in line with palm of patient's hand.	—	—
4. Position the stethoscope as follows:		
a. Place the stethoscope earpieces in the ears so that the ear tips are directed downward and forward to fit the shape of the ear canal.	—	—
b. Locate pulse of brachial artery by palpating in the bend of the elbow.	—	—
c. Place bell or diaphragm of stethoscope over the pulse point. Do NOT apply bell or diaphragm too firmly because excessive pressure distorts pulse sounds.	—	—
<b>Note.</b> Placing the bell or diaphragm directly over the artery makes more accurate BP readings possible.		
5. Inflate the cuff as follows:		
a. Tighten thumbscrew of air bulb (clockwise) with one hand while holding stethoscope in place with other hand.	—	—
b. Inflate the cuff by pumping the air bulb. You will hear pulse sounds. As pressure in the cuff increases, the sounds will disappear. Continue inflating the cuff until the pressure gauge indicates 20-30 mm Hg above where pulse sounds were last heard.	—	—
<b>Note.</b> If you cannot hear the pulse sounds, inflate the cuff while palpating the brachial pulse. Note the point on the gauge where the pulse disappears. Deflate the cuff and wait at least 15 seconds. When re-inflating the cuff to obtain a BP reading, pump the pressure 20-30 mm Hg above the point at which the pulse disappeared.		

Performance Measures	Go	No Go
6. Determine the systolic and diastolic blood pressure readings as follows:		
a. Loosen thumbscrew of air bulb (counterclockwise) and allow air to escape slowly (about 2-4 mm Hg per second). Watch the gauge and listen with the stethoscope.	—	—
<b>Note.</b> Do not let the cuff remain inflated for more than 2 minutes.		
b. As the cuff is being deflated, listen for the systolic pressure -- the pressure within the cuff indicated by the level of the mercury column at the moment the first clear, rhythmic pulsatile sound is heard.	—	—
c. As the cuff is being deflated, listen for the first diastolic pressure -- the pressure within the cuff indicated by the level of the mercury column at the moment the sound becomes muffled.	—	—
d. As the cuff is being deflated, listen for the second diastolic pressure -- the pressure within the cuff at the moment the sound disappears, i.e., the onset of silence.	—	—
<b>Note.</b> The first and second diastolic pressures can occur separately or at the same point.		
<b>Note.</b> Repeat any suspicious readings, but deflate the cuff completely between attempts to check the BP. Wait approximately 1 minute between readings to allow normal circulation to return to the limb.		
7. Record and report the systolic and diastolic readings as follows:		
a. Record the patient's position and the arm used to measure the BP.	—	—
b. BP, measured in millimeters of mercury (mm Hg), is recorded as a fraction as follows, with the bottom number indicating the change of sound and the last sound heard when these two sounds do not occur at separate points:		
(1) The systolic pressure is recorded as the first number in the fraction. If the BP reading is 110/70, 110 is the systolic pressure.	—	—
(2) The diastolic pressure is recorded as the second number in the fraction. If the BP reading is 110/70, 70 is the diastolic pressure.	—	—
<b>Note.</b> It is important to follow the procedure for recording BP in your unit so that BP readings taken by all personnel are recorded in a consistent manner.		

<b>Performance Measures</b>	<b>Go      No Go</b>
c. When the change in sounds (1st diastolic pressure) and cessation of sounds (2nd diastolic pressure) are heard at separate points, both diastolic pressures should be recorded as follows:	
(1) If the BP reading is <i>110/70/40</i> , 110 is the systolic pressure; 70 is the first diastolic pressure; and 40 is the second diastolic pressure.	— —
(2) If pulse sounds are heard all the way down to zero, this should be recorded. For example, a BP reading could be <i>110/70/0</i> .	— —
d. Compare the BP to previous readings and report abnormalities to the charge nurse and/or other appropriate personnel.	— —
<b>OVERALL EVALUATION</b>	— —

**Written Exercises:**

1. What are the definitions of (a) systolic pressure, (b) first diastolic pressure, and (c) second diastolic pressure? Which of these pressures will you report as a blood pressure reading?

( \_\_\_\_\_ pressure/\_\_\_\_\_ pressure )

2. Describe five factors that influence the blood pressure in normal, healthy adults.

3. How does the size of the cuff influence the blood pressure reading?

4. How do you prepare the patient before measuring his blood pressure?
  
  
  
  
  
  
5. Describe the proper position of the cuff and manometer when measuring the blood pressure.
  
  
  
  
  
  
6. When and why should you locate the pulse of the brachial artery before measuring the blood pressure?
  
  
  
  
  
  
7. When measuring a patient's blood pressure, at what point do you stop inflating the cuff?

#### References

- HQDA. (1984). Field manual: Medical specialist (FM 8-230, pp. 14-12 to 14-17). Washington, DC: Author.
- HQDA. (1988). Soldier's manual: CMF 91 general medical tasks (STP 8-91-SM, Task 081-831-0012). Washington, DC: Author.
- Suddarth, D. S. (Ed.). (1991). Lippincott manual of nursing practice (5th ed.). Philadelphia: J. B. Lippincott.
- Taylor, C., Lillis, C., & LeMone, P. (1993). Fundamentals of nursing: The art and science of nursing care (2nd ed.). Philadelphia: J. B. Lippincott.

**2.04: Prepare an IV Additive  
(66H, 66E, 91C)**

**Introduction:**

This task summary describes preparation of an IV additive when unit dose services are not available in a field environment. Pharmacists commonly provide unit dose services in fixed MTFs, but they cannot always provide these services in a theater of operation (DMSB, 1994).

**Task Summary:**

**Conditions**

You are given the following physician's order for an IV medication (in mg). You must calculate the required volume of medication (in ml) and prepare the medication to be given IV piggy-back.

A patient needs 90 mg of gentamicin to be given IV piggy-back (IVPB). You have gentamicin on hand in the strength of 40 mg per ml. What volume of gentamicin would you add to the solution that is to be piggy-backed into the intravenous infusion?

You have the following equipment and supplies: Written IV calculation exercise; piggy-back IV bag; a 5 cc syringe and needle in sterile wrapping; 1 medication vial; 1 blank label; sterile alcohol pads; 1 pencil; 1 table; 1 chair.

**Standards**

Calculate the required volume of medication (in ml) and prepare the medication to be given IV piggy-back IAW the references. Any appropriate formula may be used to obtain the medication dosage, but all calculations must be shown.

## Performance Measures

**Go      No Go**

1. Calculate the correct volume of the IV medication to be given using an appropriate formula as follows:

- a. Write out the formula:

<b>Labeling Information (known)</b>	<b>Prescribed Dose (unknown)</b>
---	--------------------------------------

$$\frac{\text{Amount of drug}}{\text{Unit of measure}} = \frac{\text{Amount of drug}}{\text{Unit of measure}}$$

**Note.** This formula uses a true proportion in which two ratios are established. The first ratio uses information about the drug on hand. This information is found on the label of the drug preparation. The label gives the amount of drug in one unit of measure. The unit of measure may be 1 or more ml. The second ratio is established from information available in the physician's order. To have a true proportion, the second ratio must be stated in the same order and unit of measure as the first ratio.

- b. Substitute the information from the present problem into the formula:

$$\frac{40 \text{ mg}}{1 \text{ ml}} = \frac{90 \text{ mg}}{x \text{ ml}}$$

**Note.** The ratio of the strength of solution on hand = the ratio of the required amount of drug to the unknown amount of solution (x).

- c. Multiply the inner values:

$$(40 \text{ mg}) (x \text{ ml}) = 40 x$$

- d. Multiply the outer values:

$$(90 \text{ mg}) (1 \text{ ml}) = 90$$

- e. The multiplied inner value equals the multiplied outer value:

$$40x = 90$$

- f. Divide 90 by 40 to find x:

$$x = 90/40$$

$$x = 2.25 \text{ ml}$$

**Performance Measures****Go    No Go**

2. Calculate the correct volume of the IV medication for the given physician's order using another formula as follows:

- a. Write out the formula:

$$\frac{\text{Desired Dose}}{\text{Available Dose}} * \text{Quantity} = \text{Unknown}$$

where Desired Dose = prescribed dose.

Available dose = dose on hand.

Quantity = unit of measure.

Unknown = quantity or units of measure to be given.

"\*" is used to indicate multiplication.

The formula can be abbreviated as follows:

$$\frac{D}{H} * Q = x$$

- b. Substitute the appropriate values for the problem into the formula:

$$\frac{90 \text{ mg}}{40 \text{ mg}} * 1 \text{ ml} = x$$

- c. Solve for x (the unknown):

$$90/40 = 2.25$$

$$(2.25) (1 \text{ ml}) = 2.25 \text{ ml}$$

3. When necessary, reconstitute a powder to obtain the required solution for administration as follows:

- a. Obtain the following information from the drug label:

- (1) Total quantity of drug in the vial or ampule.
- (2) Amount and type of diluent to add to the powder.
- (3) Strength of the resulting solution.
- (4) Shelf life (expiration date) of the resulting solution.

- b. Reconstitute the powder as directed.

- c. Use the information about the strength of the solution in the formula in step 1 or 2.

**Note.** When diluent is added to a powder, the powder increases the fluid volume. Therefore, the label calls for less diluent than the total volume of the prepared solution.

Performance Measures	Go	No Go
4. Prepare the indicated volume of medication to be given IV piggy-back (IVPB) as follows:		
a. Draw 2.25 ml of medication from vial into syringe, using aseptic technique.	____	____
b. Clean injection port of IV bag with alcohol swab and inject medication into solution.	____	____
c. Attach medication label, to include name of medication, date, time, and initials of person preparing the IV additive.	____	____
d. Gently mix medication with solution.	____	____
<b>OVERALL EVALUATION</b>	____	____

**Written Exercises:**

Calculate the required volume of medication (in ml) for each of the following written exercises. Show your calculations using one of the formulas described in the task summary.

1. A physician orders 350 mg cefazolin IVPB. The vial is labeled *500 mg cefazolin, add 2 ml diluent for solution of 225 mg/ml*. You would add \_\_\_\_\_ ml of cefazolin to the IVPB solution.
2. A physician orders 2 gram nafcillin IVPB, and 1 gram vials are available. A 1 gram vial requires 5 ml of diluent to produce a 200 mg/ml solution. You would add \_\_\_\_\_ ml of nafcillin to the IVPB solution.
3. A physician's order states *Infuse D5 0.45NS with 30 mEq KCl per liter*. The potassium chloride is available in vials of 20 mEq/10 ml. You would add \_\_\_\_\_ ml of potassium chloride to the IV.
4. A physician orders an IV infusion of 250 ml D<sub>5</sub>W with 500 mg aminophylline. Aminophylline is available in vials of 25 mg/ml. You would add \_\_\_\_\_ ml of aminophylline to 250 ml D<sub>5</sub>W.

5. A physician orders 500 mg cefazolin IVPB. The vial is labeled *1 gram cefazolin, add 3 ml diluent for solution of 250 mg/ml*. You would add \_\_\_\_\_ ml of cefazolin to the IVPB solution.
6. A physician orders 250 mg ampicillin IVPB. The vial of ampicillin is labeled *Reconstitute with 3.5 ml sterile water for injection to yield 1 gm/4 ml*. You would add \_\_\_\_\_ ml of ampicillin to the IVPB solution.
7. A physician orders 5 million units penicillin G potassium IV in 100 ml D<sub>5</sub>W. The medication label reads penicillin G potassium 20,000,000 units dry powder. *Reconstitute with 31.6 ml sterile water for injection to yield a concentration of 500,000 units/ml*. You would add \_\_\_\_\_ ml of the reconstituted penicillin G to the 100 ml D<sub>5</sub>W.
8. A physician orders 15,000,000 units penicillin G potassium IV over 24 hours in 1000 ml of D<sub>5</sub>W. Penicillin G potassium is available as 500,000 units/ml. You would add \_\_\_\_\_ ml of penicillin G potassium to the IV fluid.
9. A physician orders 500 mg ampicillin IV in 50 ml NS. Ampicillin is available after reconstitution as 250 mg/ml. You would add \_\_\_\_\_ ml of ampicillin to the IV fluid.
10. A physician orders 400 mg aminophylline IV in 50 ml D<sub>5</sub>W. Aminophylline 500 mg/20 ml is available. You would add \_\_\_\_\_ ml of aminophylline to the D<sub>5</sub>W.

#### References

Erickson, B., & Todd, C. M. (1995). Dosage calculations (2nd ed.). Springhouse, PA: Springhouse Corporation.

HQDA. (1990). Soldier's manual and trainer's guide: MOS 91C practical nurse, skill levels 2/3/4/5 (STP 8-91C25-SM-TG: Task 081-835-3002). Washington, DC: Author.

**2.05: Calculate an Oral Medication Dosage  
(66H, 91B, 91C)**

**Introduction:**

This task summary describes calculation of an oral medication dosage when unit dose services are not available in a field environment. Pharmacists commonly provide unit dose services in fixed MTFs, but they cannot always provide these services in the theater of operation (DMSB, 1994).

**Task Summary:**

**Conditions**

You are given the following physician's order for an oral medication (in mg). You must calculate the amount of medication (in ml) to be given by mouth.

The physician has ordered diphenhydramine (Benadryl) elixir 25 mg po qid for a patient. The elixir on hand contains 12.5 mg per 5 ml. How many ml of the elixir must be administered to obtain the required dose?

You have the following equipment and supplies: Written calculation exercise; 1 pencil; 1 table; 1 chair.

**Standards**

Calculate the required volume of medication (in ml) for the given physician's order IAW the references. Any appropriate formula may be used to obtain the medication dosage, but all calculations must be shown.

**Performance Measures**

Go    No Go

1. Interpret abbreviations correctly. Following are examples of abbreviations used in prescribing oral medications:

ac	before meals
bid	twice a day
cap or caps	capsule
cc	cubic centimeter
g or gm	gram
hs	at bedtime
ml	milliliter

Performance Measures		Go	No Go
pc	after meals		
po	by mouth		
prn	as needed		
q	each, every		
qh	every hour		
qid	four times a day		
qod	every other day		
qs	as much as is necessary, a sufficient amount		
tab	tablet		
tid	three times a day		
2. Use appropriate metric system equivalents when calculating oral medication dosages as follows:			
a. Recall metric system equivalents. For example,			
(1)	1 liter	= 1000 milliliters (ml)	— —
(2)	1 milliliter (ml)	= 1 cubic centimeter (cc)	— —
(3)	1 gram	= 1000 milligrams (mg)	— —
(4)	0.001 milligram	= 1 microgram (mcg)	— —
b. Calculate metric system equivalents as needed. For example,			
(1)	The gram is 1000 times larger than the milligram. To change grams to milligrams, multiply the number of grams by 1000, or move the decimal point 3 places to the right as follows:		
1 g	=	1000 mg	— —
0.5 g	=	500 mg	— —
(2)	To change milligrams to grams, the process is reversed. The number of milligrams is divided by 1000, or the decimal point is moved 3 places to the left as follows:		
600 mg	=	0.60 g	— —
10 mg	=	0.01 g	— —
Note. Since very few conversions are done anymore between the apothecaries system and metric system, the apothecaries approximate equivalents are not taught here. Current labeling requirements are for the metric system only.			

### Performance Measures

Go    No Go

3. Calculate the medication dosage for the given physician's order using an appropriate formula as follows:

- a. Write out the formula: \_\_\_\_\_

<b>Labeling Information</b>	<b>Prescribed Dose</b>
(known)	(unknown)

$$\frac{\text{Amount of drug}}{\text{Unit of measure}} = \frac{\text{Amount of drug}}{\text{Unit of measure}}$$

**Note.** This formula uses a true proportion in which two ratios are established. The first ratio uses information about the drug on hand. This information is found on the label of the drug preparation. The label gives the amount of drug in one unit of measure. The unit of measure may be a capsule, a tablet, 1 ml, etc. The second ratio is established from information available in the physician's order. To have a true proportion, the second ratio must be stated in the same order and unit of measure as the first ratio.

- b. Substitute the information from the present problem into the formula: \_\_\_\_\_

$$\frac{12.5 \text{ mg}}{5 \text{ ml}} = \frac{25 \text{ mg}}{x \text{ ml}}$$

**Note.** The ratio of the strength of solution on hand = the ratio of the required amount of drug to the unknown amount of solution (x).

- c. Multiply the inner values: \_\_\_\_\_

$$(12.5 \text{ mg})(x \text{ ml}) = 12.5 x$$

- d. Multiply the outer values: \_\_\_\_\_

$$(25 \text{ mg})(5 \text{ ml}) = 125$$

- e. The multiplied inner value equals the multiplied outer value: \_\_\_\_\_

$$12.5 x = 125$$

- f. Divide 125 by 12.5 to find x: \_\_\_\_\_

$$x = 125/12.5$$

$$x = 10 \text{ ml}$$

### Performance Measures

Go    No Go

4. Calculate the medication dosage for the given physician's order using another formula as follows:

- a. Write out the formula:

$$\frac{\text{Desired Dose}}{\text{Available Dose}} * \text{Quantity} = \text{Unknown}$$

where Desired Dose = prescribed dose.

Available dose = dose on hand.

Quantity = unit of measure.

Unknown = quantity or units of measure to be given.

"\*" is used to indicate multiplication.

The formula can be abbreviated as follows:

$$\frac{D}{H} * Q = x$$

- b. Substitute the appropriate values for the problem into the formula:

$$\frac{25 \text{ mg}}{12.5 \text{ mg}} * 5 \text{ ml} = x$$

- c. Solve for x (the unknown):

$$x = (2) (5 \text{ ml}) = 10 \text{ ml diphenhydramine (Benadryl)}$$

### OVERALL EVALUATION

#### Written Exercises:

Calculate the appropriate conversion or the prescribed oral medication dosage for each of the following written exercises. Show your calculations using one of the formulas described in the task summary.

1. Convert the following:

$$400 \text{ mg} = \underline{\hspace{2cm}} \text{ gm} \qquad \qquad 5 \text{ gm} = \underline{\hspace{2cm}} \text{ mg}$$

$$0.5 \text{ gm} = \underline{\hspace{2cm}} \text{ mg} \qquad \qquad 2 \text{ mg} = \underline{\hspace{2cm}} \text{ gm}$$

$$1300 \text{ mg} = \underline{\hspace{2cm}} \text{ gm} \qquad \qquad 0.003 \text{ gm} = \underline{\hspace{2cm}} \text{ mg}$$

2. The physician orders 1 gm po qid of a medication. The dosage on hand is 500 mg in one capsule. You would give the patient \_\_\_\_ caps per dose.
3. The physician orders 0.1 gm po tid of a medication. The dosages on hand are 10 mg per tablet, 25 mg per tablet, and 50 mg per tablet. You would give the patient \_\_\_\_ tabs per dose in the strength of \_\_\_\_ mg per tablet.
4. The physician orders 8 gm of a medication divided into 4 doses over 24 hours. The dosage available is 0.5 gm per tablet. You would give the patient \_\_\_\_ tabs per dose.
5. The physician orders 30 mg po of a medication. The dosage on hand is 20 mg per 5 ml. You would give the patient \_\_\_\_ ml per dose.
6. The physician orders 200 mg po of a medication. It is available in 25 mg capsules. You would give the patient \_\_\_\_ caps per dose.

7. The physician orders 75 mg po tid of a medication. The medication is available 30 mg per 5 ml. You would give the patient \_\_\_\_ ml per dose.
8. The physician orders 25 mEq po bid of a medication. The dosage available is 20 mEq/30 ml. You would give the patient \_\_\_\_ ml per dose.
9. The physician orders 300 mg po hs prn of a medication. The available dose is 250 mg per 5 ml. You would give the patient \_\_\_\_ ml per dose.
10. A physician orders 0.25 gm po qid of a medication. The dose available is 125 mg per 5 ml. You would give the patient \_\_\_\_ ml per dose.

#### References

- Erickson, B., & Todd, C. M. (1995). Dosage calculations (2nd ed.). Springhouse, PA: Springhouse Corporation.
- HQDA. (1995). Soldier's manual and trainer's guide: MOS 91B medical specialist, skill levels 1/2/3/4/5 (STP 8-91B15-SM-TG: 081-835-3001 & Appendix A). Washington, DC: Author.

**2.06: Calculate the Flow Rate for an IV Infusion  
(66H, 66E, 91B, 91C)**

**Introduction:**

This task summary describes calculation of the flow rate for an IV infusion when automated equipment for regulating an IV infusion is not available in a field environment. Various types of intravenous (IV) flow meters and infusion pumps are readily available in fixed MTFs, but they are not always available in the field environment.

There are a variety of IV infusion sets available for use. The size of the opening into the drip chamber determines the size (volume) of the drop delivered by the infusion set. The most common macrodrip sets are calibrated to deliver 10, 15, or 20 drops per milliliter. Microdrip (minidrip) sets are calibrated to administer small and very precise amounts of fluid. They deliver 60 drops per milliliter. The drop size, called the drop factor, is identified on the package of the IV infusion set.

The IV flow rate is regulated in drops per minute (gtt/min). Various methods of calculating the IV flow rate will be presented. Remember to determine the drop factor of the available IV infusion set before calculating the flow rate.

**Task Summary:**

**Conditions**

You are given a scenario in which you have the following physician's order for the total volume of IV fluid to be infused, delivery rate of the IV tubing set, and total infusion time. You must calculate the proper flow rate for the IV infusion.

The physician has ordered a patient to have 1.5 liters of IV fluid infused in 12 hours. The infusion set you are using administers 10 drops/ml (gtt/ml). Calculate the IV flow rate (drops per minute) that the patient should receive.

You have the following equipment and supplies: Written calculation exercise; 1 pencil; 1 table; 1 chair.

**Standards**

Perform calculations to obtain the flow rate for the given physician's order IAW the references. Any appropriate formula may be used to obtain the flow rate, but all calculations must be shown.

## Performance Measures

Go   No Go

1. One formula that can be used to obtain the drops per minute that a patient should receive is as follows:

(Infusion volume)(gtts/ml of infusion set)

Total infusion time in minutes

You can remember this formula as follows:

$$\text{FLOW RATE (gtt/min)} = \frac{\text{(VOLUME) (DROP FACTOR)}}{\text{TIME in minutes}}$$

- a. Write out the formula, where 1500 ml is the total volume to be infused in 12 hours and you are using a 10 gtt/ml infusion set:      — —

$$\frac{(1500 \text{ ml}) (10 \text{ gtt/ml})}{(12 \text{ hrs}) (60 \text{ min/hr})}$$

- b. Perform calculations:      — —

$$\frac{15000}{720} = 20.8 \text{ gtt/min}$$

2. Another formula is as follows:

- a. Calculate the prescribed ml/hr:      — —

$$\frac{\text{Total solution}}{\text{No. of hrs to run}} = \text{ml per hour}$$

$$\text{In this example, } \frac{1500 \text{ ml desired}}{12 \text{ hrs}} = 125 \text{ ml/hr}$$

- b. Divide ml/hr according to the infusion set used:      — —

$$\frac{(\text{ml/hr}) (\text{drop factor})}{60 \text{ minutes}} = \text{gtt/min}$$

$$\text{In this example, } \frac{(125) (10)}{60} = 20.8 \text{ gtt/min}$$

Performance Measures		Go	No Go
c. OR, a shortcut for the previous step 2b is as follows:		—	—
If drop factor:	Divide ml/hr by:		
10 gtt/ml	6		
15 gtt/ml	4		
20 gtt/ml	3		
60 gtt/ml	1		
In this example, $\frac{125 \text{ ml/hr}}{6} = 20.8 \text{ gtt/min.}$			
<b>Note.</b> Both milliliters per hour (ml/hr) and drops per minute (gtt/min) are rounded to the nearest whole number.			
<b>OVERALL EVALUATION</b>		—	—

#### Written Exercises:

Calculate the IV flow rate for each of the following written exercises. Show your calculations using one of the formulas described in the task summary.

- The order is to infuse an IV fluid at 125 ml/hr for the next 24 hours. The infusion set you are using delivers 10 gtt/ml. The IV flow rate should be regulated at \_\_\_\_\_ gtt/min.
- The order is to infuse 150 ml of an IV fluid at 20 ml/hr. The infusion set you are using delivers 60 gtt/ml. The IV flow rate should be regulated at \_\_\_\_\_ gtt/min. The IV will last \_\_\_\_\_ hours.
- The order is to infuse 1 liter of an IV fluid over 8 hours. The infusion set you are using delivers 20 gtt/ml. The patient should receive \_\_\_\_\_ ml/hr of the IV fluid. The IV flow rate should be regulated at \_\_\_\_\_ gtt/min.

4. The order is to infuse 250 ml of an IV fluid over 12 hours. The infusion set you are using delivers 60 gtt/ml. The patient should receive \_\_\_\_\_ ml/hr of the IV fluid. The IV flow rate should be regulated at \_\_\_\_\_ gtt/min.
  
  
  
  
  
  
  
  
  
5. The order is to infuse 500 ml of an IV fluid over 8 hours. You are using microdrip tubing. The patient should receive \_\_\_\_\_ ml/hr of the IV fluid. The IV flow rate should be regulated at \_\_\_\_\_ gtt/min.
  
  
  
  
  
  
  
  
  
6. The order is to infuse 1 liter of an IV fluid over 8 hours. The infusion set you are using delivers 10 gtt/ml. The patient should receive \_\_\_\_\_ ml/hr of the IV fluid. The IV flow rate should be regulated at \_\_\_\_\_ gtt/min.
  
  
  
  
  
  
  
  
  
7. The order is to infuse 1 liter of an IV fluid over 15 hours. The infusion set you are using delivers 15 gtt/ml. The patient should receive \_\_\_\_\_ ml/hr of the IV fluid. The IV flow rate should be regulated at \_\_\_\_\_ gtt/min.
  
  
  
  
  
  
  
  
  
8. The order is to infuse 600 ml of an IV fluid over 3 hours. The infusion set you are using delivers 15 gtt/ml. The patient should receive \_\_\_\_\_ ml/hr of the IV fluid. The IV flow rate should be regulated at \_\_\_\_\_ gtt/min.

9. The order is to infuse 1 liter of an IV fluid over 6 hours. The infusion set you are using delivers 10 gtt/ml. The patient should receive \_\_\_\_\_ ml/hr of the IV fluid. The IV flow rate should be regulated at \_\_\_\_\_ gtt/min.
  
10. The order is to infuse 1 liter of an IV fluid over 8 hours. The infusion set you are using delivers 20 gtt/ml. The patient should receive \_\_\_\_\_ ml/hr of the IV fluid. The IV flow rate should be regulated at \_\_\_\_\_ gtt/min.

**Optional Written Exercises:**

Trainers may wish to give additional instruction in calculating dosages of drugs as follows:

1. You are given 50 mg of a medication in 250 ml D<sub>5</sub>W. The physician orders the medication to be given at 10 ml/hr. Calculate the dosage in mcg/min. Calculate the dosage in mcg/kg/min. for a patient who weighs 70 kg.
  
2. You are given 50 mg of a medication in 250 ml D<sub>5</sub>W. You are to administer the medication at 5 mcg/kg/min. for a 70 kg patient. What is the IV flow rate?

**References**

Erickson, B., & Todd, C. M. (1995). Dosage calculations (2nd ed.). Springhouse, PA: Springhouse Corporation.

HQDA. (1995). Soldier's manual and trainer's guide: MOS 91B medical specialist, skill levels 1/2/3/4/5 (STP 8-91B15-SM-TG: Appendix A). Washington, DC: Author.

## **2.07: Prepare Sterile Items for Storage (66E, 91D)**

### **Introduction:**

This task summary describes preparation of sterile items for storage in a field environment. According to the *AORN Standards and Recommended Practices* (1994), the "shelf life of a packaged sterile item is event-related . . . and depends on the quality of the packaging material, storage conditions during transportation, and amount of handling. An evaluation of these conditions should occur before policies on shelf life are determined." (AORN, 1994, p. 249).

Army guidelines, including TB MED 2, also emphasize that the shelf life of sterilized items is event-related, not time-related. However, for purposes of inventory control and inventory rotation, Army publications list guidelines for packaging and dating sterile items. Operating room personnel must apply these guidelines to their particular situation in a deployed or field status.

### **Task Summary:**

#### **Conditions**

You have a hermetically-sealed tray that has just been returned from sterilization for sterile storage. You must understand what information you should find written on it, what a load control number means, what conditions would affect the shelf life of your sterile items, and how you would prepare your sterile items if you had no heat sealers. You have the following equipment and supplies: 1 wrapped tray labeled as "minor tray" and hermetically sealed; 1 table.

#### **Standards**

Describe and explain the following principles, policies, and procedures related to the preparation of sterile items for storage IAW the references.

#### **Performance Measures**

**Go      No Go**

1. Describe the information that should be found on packages ready for sterile storage:  
Name of tray, load control number, and expiration date.
2. Interpret a 7-digit load control number as follows:
  - a. The first two digits indicate the numerical designation of the sterilizer used.
  - b. The 3rd, 4th, and 5th digits indicate the calendar day of the year (Julian Date)--e.g., 001-365 days.
  - c. The 6th and 7th digits indicate the number of the sterilization cycle during the 24-hour period.

<b>Performance Measures</b>	<b>Go      No Go</b>
3. Explain that color coding systems may be used only as an adjunct to the required expiration date and load control number.	— —
4. Explain that a log book should be maintained with the following information IAW TB MED 2:	
a. Load control number.	— —
b. Expiration date.	— —
c. Contents of load.	— —
d. Operator.	— —
5. State that the shelf life of a packaged sterile item is event related. Explain that the length of time an item is considered sterile depends on factors such as the following:	
a. Type and configuration of packaging materials used.	— —
b. Number of times a package is handled before use.	— —
c. Storage on open or closed shelves.	— —
d. Condition of the storage area (e.g., cleanliness, temperature, humidity).	— —
e. Use of dust covers and method of seal.	— —
6. State the following expiration date policies IAW FM 8-38 and explain how these dates should be adjusted for a given situation in the field (i. e., a situation affecting the quality of packaging material, storage conditions, amount of handling, etc.):	
a. With dust cover and tape (not sealed in any way)-- 30 days.	— —
b. Hermetically-sealed plastic cover -- 6 months.	— —
<b>OVERALL EVALUATION</b>	— —

#### **Written Exercises:**

- 1. Compare and contrast major differences in preparing sterile items for storage in fixed facilities and in the field environment.

2. Describe a realistic scenario in which you are with your unit in a deployed status. Explain how you would prepare and store your sterile items given the conditions in this field environment.

#### References

Academy of Health Sciences, U.S. Army. (1991). 301-91D10 operating room specialist course: Clinical training annex. Fort Sam Houston, TX: Author.

Association of Operating Room Nurses, Inc. (1994). 1994 AORN standards & recommended practices. Denver, CO: Author.

HQDA. (1979). Centralized matériel service/section (FM 8-38). Washington, DC: Author.

HQDA. (1987). Sterilizing medical, surgical, dental, and veterinary matériel (TB MED 2). Washington, DC: Author.

## **2.08: Perform High Level Disinfection (66E, 91D)**

### **Introduction:**

This task summary describes the performance of high level disinfection in a field environment. The following introductory information is taken from *Alexander's Care of the Patient in Surgery* (pp. 75-78). Refer to the listed references for more detailed explanatory information.

Disinfection is the process of destroying or inhibiting disease-producing microorganisms outside the body. It is most frequently achieved by chemicals in solution. High-level disinfectants can kill bacteria and viruses if contact time is sufficient.

A high-level disinfectant should be used for disinfection of surgical instruments when sterilization is not possible. High-level disinfection of instruments and equipment should be carried out immediately before use of the items and after terminal cleaning prior to storage.

### **Task Summary:**

#### **Conditions**

You are in a field MTF and must perform high level disinfection on a heat-sensitive item. You have the following equipment and supplies: 1 soak pan with cover; 1 heat-sensitive item; 1 bottle of Cidex; 1 instrument table; 1 pack of sterile towels; 1 pair of sterile gloves; 1 bottle of sterile distilled water.

#### **Standards**

Use appropriate technique to perform high level disinfection on a heat-sensitive item IAW the references.

#### **Performance Measures**

**Go      No Go**

1. State examples of heat-sensitive items for which high level disinfection is appropriate in a field MTF (e.g., cystoscope or other scopes, lenses, some fiberoptic cables).      —      —
2. Disassemble and inspect the instruments and equipment to be disinfected and remove organic debris as follows:
  - a. Disassemble items as necessary.      —      —
  - b. Check for cracked or cloudy lenses, defects or scratches on metal, and improperly fitting connectors as applicable.      —      —
  - c. Clean with mild detergent to remove organic debris.      —      —

<b>Performance Measures</b>	Go	No Go
<b>Note.</b> A dried piece of organic or protein type residue trapped in a channel of an endoscope may render the scope useless.		
<b>Warning.</b> Particular attention must be paid to the cleaning of the lenses or viewing will be obstructed because of lens damage. Remove debris from around the lenses with a fine toothpick.		
d. Make sure all parts are present.	—	—
3. Place items in the chemical solution as follows:		
a. Open a soak pan on the instrument table.	—	—
b. Place items into the soak pan, starting with the largest items.	—	—
c. Cover items with chemical solution. (Currently, glutaraldehyde (Cidex) often is the chemical solution used in field MTFs.)	—	—
<b>Warning.</b> When using Cidex, the personnel protective devices that must be used include: Mask, eye protection, gloves and long sleeves. Also, Cidex should be located where the highest level of ventilation can be achieved and the least amount of traffic is found.		
d. Place lid on the soak pan.	—	—
e. Label soak pan with date and time when disinfectant solution is mixed.	—	—
<b>Note.</b> Alkalinized glutaraldehyde (Cidex) solution changes PH and gradually loses effectiveness after the date of activation. Mark an expiration date on the container when the solution has been activated. The solution is reusable until the expiration date is reached.		
f. Record the start soak time, date, and initials on a piece of tape and place it on the soak pan lid.	—	—
g. Soak items for the time recommended by the manufacturer of the disinfectant used.	—	—
<b>Note.</b> "Construction and composition of the object influence the disinfection time. A hard, flat, smooth-surfaced object requires less disinfection time than an uneven-surfaced object or a porous material" (Meeker & Rothrock, 1991).		
4. Rinse the items as follows:		
a. Open another sterile soak pan and pour sterile distilled water into it without causing contamination.	—	—
b. Put on sterile gloves.	—	—

<b>Performance Measures</b>	<b>Go      No Go</b>
c. Remove items from the chemical solution and rinse as follows:	— —
(1) Pour sterile distilled water over the items, using a syringe as needed to make sure all surfaces are rinsed well and/or	
(2) Immerse items in sterile distilled water, ensuring that all hollow spaces are filled. Rinse items with a forward and backward movement in the sterile distilled water.	
d. Repeat the rinse several times to make sure that all crevices and channels have no disinfectant solution remaining.	— —
5. Dry the items as follows:	
a. Drain excess water from the items.	— —
b. Dry items on a sterile towel and reassemble as needed.	— —
c. Hand items to the operating room specialist at the operating table.	— —
<b>OVERALL EVALUATION</b>	— —

**Written Exercises:**

1. After inspecting the items to be disinfected, your next step in high level disinfection is to \_\_\_\_\_.

2. When using Cidex for high level disinfection, the personnel protective devices that must be used

are \_\_\_\_\_.

3. When performing high level disinfection, you should rinse the items being disinfected with

\_\_\_\_\_.

4. Compare and contrast differences in the performance of high level disinfection between fixed facilities and the field environment. For example, what items would high level disinfection be appropriate for in fixed facilities and in a field MTF?

#### References

- HQDA. (1993). Soldier's manual and trainer's guide: MOS 91D operating room specialist, skill levels 1/2/3/4 (STP 8-91D14-SM-TG: Task 081-825-0010). Washington, DC: Author.
- Meeker, M. H., & Rothrock, J. C. (1991). Alexander's care of the patient in surgery (9th ed.). St. Louis: Mosby.

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### C. Skills Performed in an Expanded Role in the Field

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#### 3.01: Triage Casualties (66H, 91B)

##### **Introduction:**

This task summary describes triaging casualties in a field environment. The term "mass casualties" means that a large number of casualties has been produced simultaneously or within a relatively short period of time and that the number of patients requiring medical care greatly exceeds the medical capability to provide individualized treatment and evacuation. At the same time the large number of casualties is produced, there may be disruptions in the supply, communication, and transportation systems. In other words, a great disparity exists between the number of casualties requiring care and the medical resources (personnel, facilities, equipment, supplies, evacuation means, and time) available to provide that care.

Actually, a mass casualty situation is present when one field medic is confronted with two critically injured casualties simultaneously. An inability to provide these patients the traditional level of emergency medical treatment exists for a period of time. Thus, triage becomes the identifying feature of a mass casualty situation.

Note that no uncommitted medical units are in a theater of operations. Evacuation means for casualties also are limited. Therefore, when casualties are produced in numbers exceeding available medical resources, medical units within the theater must be prepared to alter the standards and scope of medical treatment which they ordinarily provide. These alterations in situations of medical disparity must be in compliance with the objective *to provide the greatest good for the greatest number of casualties*.

"Triage" or "sorting" of mass casualties means the evaluation and categorization of casualties for treatment and evacuation to facilitate the intelligent use of available resources and thus ensure the greatest good for the greatest number of casualties. Life takes precedence over limb, and functional repair over cosmetic concern.

Personnel must remember that triage is based on the principle of accomplishing the greatest good for the greatest number of wounded and injured in the special circumstances of warfare at a particular time. Every effort should be made to make sure that existing resources are expended upon the maximum number of salvageable soldiers. All resources cannot be tied up with casualties who have multiple life-

threatening wounds and a poor prognosis. Because these casualties require hours of surgeons' time and maximum operating room resources, they could divert care from other casualties whose injuries are less serious and more rapidly treatable.

Although the nature of medical management changes during a mass casualty situation from *worst come first* to the *greatest good for the greatest number*, at no time is the abandonment of a single casualty contemplated. On the contrary, categorization of treatment scope during the mass casualty situation is based upon clinically sound criteria as to what can be done on a positive basis to save the lives of as many casualties as the medical means permit.

Moreover, there must be frequent reassessment and reassigning of triage priorities as conditions change. As each casualty moves from one area of treatment to another, his condition is continually evaluated to determine whether a change in his category of treatment emphasis is warranted. When a disparity no longer exists between the number of casualties and the available medical resources, routine treatment emphasis will govern once again.

Following are four general treatment categories into which casualties are sorted during triage:

**IMMEDIATE:** This category has the highest priority for treatment. It is the category for the casualty whose condition demands immediate treatment to save life or limb. These casualties present with severe, life-threatening wounds requiring immediate intervention with procedures that generally are short in duration and economical in terms of medical resources. These casualties have a high likelihood of survival with immediate treatment. Depending on the situation, examples of casualties in this category may include those with anaphylaxis, respiratory emergencies (sucking chest wounds, pneumothorax, airway obstruction), unstable abdominal wounds, uncontrolled bleeding, unresponsiveness to fluid resuscitation, incomplete amputations, or femur fractures.

**DELAYED:** This category is for the casualty whose condition is such that, with the application of modest emergency procedures, the possibility of morbidity or mortality increases very little by delaying major definitive procedures until they can be performed under more ideal circumstances. These casualties can tolerate delay prior to operative intervention without unduly compromising the likelihood of a successful outcome. When medical resources are overwhelmed, these casualties are held until immediate casualties are treated. Depending on the situation, examples of casualties in this category may include those with maxillofacial injuries without airway compromise or upper extremity fractures.

**MINIMAL:** This category is for the casualty whose condition is such that simple procedures will suffice and will enable him to be returned to some form of duty. Follow-up treatment may be needed after the disparity phase of the mass casualty is terminated. Many of these casualties can be treated by self-aid or buddy-aid. Often combat stress patients are sorted into this category. These casualties must be rapidly directed away from the triage area to an uncongested area where first aid and non-specialty medical personnel are available.

**EXPECTANT:** This category is for the casualty whose injuries are so massive that the probability of his survival is minimal, even if the total medical resources could be concentrated on him. Only complicated, resource-intensive, prolonged treatment would have any chance of improving the life expectancy of casualties in this category. The objective to provide the greatest good for the greatest number during the period of medical disparity dictates that medical personnel (a) manage casualties in this category with an attitude of alertness (expectancy) to changes in their condition and (b) provide them with symptomatic and supportive care (e.g., pain medications and airway management) until such time as the medical workload permits a more intensive effort on their behalf. These casualties should not be abandoned, but they should be separated from immediate treatment areas.

Sorting is accomplished by the medical personnel (triage officers) best qualified to make sound clinical judgements promptly. A Triage Officer may be a physician, nurse, dentist, physician assistant, or any other nursing personnel, depending on factors such as the situation, location, and number of medical personnel assigned. A Triage Officer does not perform medical care when assessing a casualty. He assesses all casualties initially for stability of vital functions and assigns an initial triage category to indicate the priority for treatment.

It is important to understand that being triaged as delayed or minimal does not mean that absolutely nothing is being done, or that being triaged immediate means there is an open bed. For example, frequently there are more immediate patients than there are resuscitation stations, and "triage within triage" has to occur. IVs, some medications, airways, irrigating burns and eyes, etc. are often started in the "triage" area on patients waiting for an open station. Delayed and minimal areas are staffed with some level of healthcare personnel who also begin what care and treatment they can while waiting for a bed.

While making triage decisions, the Triage Officer must keep in mind the medical facility's availability of resources and must guard against making decisions which overwhelm the capabilities for providing appropriate treatment. Examples of some of the factors the Triage Officer must keep in mind are as follows:

- a. Availability of surgeons, perioperative nursing support, and anesthesia support.
- b. Availability of blood or blood products.
- c. Availability of respiratory therapy support for the postoperative patient.
- d. Availability of evacuation methods, either surface evacuation or rapid movement by air.
- e. Exposure of the medical facility to a tactical situation and likelihood of the hospital coming under fire.
- f. Potential decrement in overall unit efficiency secondary to fatigue.

Casualties can be color-coded into a triage category by the Triage Officer to assist medical personnel in quickly identifying a casualty's priority for medical treatment.

The US Military Color Codes are:

- (1) Red - Immediate
- (2) Yellow - Delayed
- (3) Green - Minimal
- (4) Blue - Expectant

The International Color Code (countries outside the US) used for triage is the same except for the color black, which is used to identify casualties in the expectant category.

#### Task Summary:

##### Conditions

You are responsible for triaging casualties in the following field scenario. A 5-ton truck just arrived carrying 12 casualties with conventional injuries. The only medical personnel available are 1 general medical officer, 1 general surgeon, and a few nursing personnel. You are the first medical providers to see these casualties. You must assign 1 or more possible triage categories to each of the 4 casualties, explain why you chose each category, and describe the steps in treating each of the casualties. You have the following equipment and supplies: 2 chairs; 1 written triage scenario with the following descriptions of the first 4 casualties to be triaged; the following picture of the hospital layout. Note that your possible treatment areas include an X-ray room, laboratory, pre-operative area, operating room, cast room, and post-anesthesia room/ICU.

Casualty 1 - Full and partial thickness burns to face, chest, back, arms (50% total body surface) with moderate dyspnea. Closed, displaced femur fracture.

Casualty 2 - Thrown several feet and landed on right buttocks; unable to move right leg. Lower abdomen tender and rigid; mild rebound. Urge to urinate but unable to do so; blood at meatus. Mild shock.

Casualty 3 - Casualty is a surgeon from your facility who suffered a closed non-displaced fracture of lower left leg and sprain to right wrist.

Casualty 4 - Deep penetrating shrapnel wounds to both legs, groin, and lower torso; minimal external bleeding from wounds; vital signs stable. Tourniquet placed on right thigh by buddy. Shrapnel in left eye; also possible caustic agent in eyes; blurred vision both eyes.

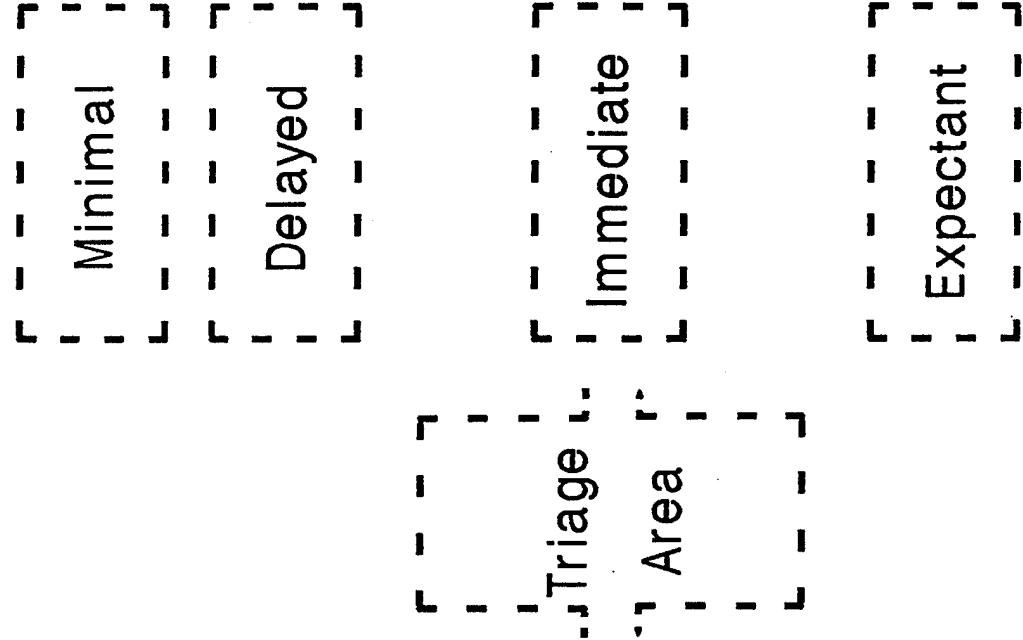


Figure 1. Possible Treatment Areas for the Triage Scenario

### **Standards**

You must (a) assign 1 or more possible triage categories to each of the four casualties, (b) explain why you chose each category, and (c) describe appropriate steps in treating each of the casualties. Treatment includes all care provided by available personnel.

**Note.** There is no definitive right answer to the scenarios. The focus of the scenarios is to evaluate the soldier's knowledge of the principles of triage and his ability to apply these principles. The explanation of the category selection and the description of the treatment plan will enable the evaluator to assess the soldier's understanding of triage.

<b>Performance Measures</b>	Go	No Go
1. Assign one or more triage categories to each of the following casualties and give an appropriate rationale for the selection of each category:		
a. Casualty 1	—	—
b. Casualty 2	—	—
c. Casualty 3	—	—
d. Casualty 4	—	—
2. Describe initial treatment steps that are consistent with each selected triage category for the following casualties:		
a. Casualty 1	—	—
b. Casualty 2	—	—
c. Casualty 3	—	—
d. Casualty 4	—	—
3. Explain how the selected triage categories and treatment steps for all four casualties are appropriate for the group of casualties considered together given the available medical personnel and medical treatment facility resources.	—	—
<b>OVERALL EVALUATION</b>	—	—

Following are possible answers for the four casualties. The answers are not prioritized in any way.

## **CASUALTY ONE**

**I. Triage Category.** Immediate.

**Rationale.** Salvageable injuries with adequate treatment; need to establish airway and support ventilation before edema (airway and pulmonary) sets in; need to reduce leg because of potential for 2-3 liters blood loss into thigh.

**Treatment Steps.** Establish airway and IV access; remove all clothing; reduce fracture with traction splint; maintain body temperature. Patient now stabilized for Delayed Category.

**II. Triage Category.** Delayed.

**Rationale.** Injuries survivable, but would consume large amount of resources which might or might not be affordable; need to treat more viable or urgent patients first and reevaluate category based on available resources.

**Treatment Steps.** Move patient to Delayed area where patient can be periodically monitored. Reevaluate and treat after urgent patients have been treated. Danger is that delay in treating burn patients makes treatment more difficult (removal of clothing, insertion of IV lines, intubation, etc).

**III . Triage Category.** Expectant.

**Rationale.** Burns too extensive given the conditions in a theater treatment facility; treatment would consume too many of the limited resources (personnel, equipment and supplies); combination of hypovolemic shock from burns and femur fracture and respiratory compromise would make survival unlikely; inadequate equipment to monitor and treat ventilatory compromise associated with respiratory burns; inadequate facilities to prevent massive infection and sepsis.

**Treatment Steps.** Move casualty to quiet area away from other patients; treat symptomatically for pain and respiratory distress; assign someone to stay with the patient.

## **CASUALTY TWO**

**I. Triage Category.** Immediate.

**Rationale.** Probable hypovolemic shock secondary to pelvic fracture and internal bleeding; shock too severe for patient to tolerate several hour delay; surgeon available to operate; little preparation required prior to surgery, therefore patient could be opened and stabilized rapidly without delaying other patients in need of surgery.

**Treatment Steps.** Move to OR; establish IV access; stabilize bleeding; delay fixation of pelvic fracture.

**II. Triage Category.** Delayed.

**Rationale.** Mild hypovolemia secondary to pelvic fracture; no immediate capability to stabilize pelvic fracture, so little value in taking to surgery and tying up limited surgical resources; patient probably able to tolerate a delay of several hours.

**Treatment Steps.** Move to delayed area for periodic monitoring.

## CASUALTY THREE

**I. Triage Category.** Immediate.

**Rationale.** Surgeon is desperately needed to treat other casualties; best utilization would be in OR, but fracture needs to be set and cast first.

**Treatment Steps.** X-ray; set and cast leg; wrap wrist. Surgeon assists in OR and elsewhere as needed.

**II. Triage Category.** Delayed.

**Rationale.** This is not a life-threatening injury that will worsen with delay; best if fracture is reduced and casted at same time with adequate time to do multiple X-rays to ensure proper alignment; double injury would severely limit contribution of surgeon so little value in treating first.

**Treatment Steps.** Splint fracture; move to Delayed area; assign surgeon to assist in monitoring other casualties in Delayed area.

**III. Triage Category.** Minimal.

**Rationale.** Relatively minor injury; temporary splinting of the fracture and sprain will enable surgeon to provide some assistance; surgeon unlikely to be able to tolerate operating even if fracture were set and cast; unable to operate because of wrist sprain.

**Treatment Steps.** Splint fracture; assign surgeon to assist in treatment of other minimal patients or elsewhere as needed with limited mobility/capability.

## **CASUALTY FOUR**

- I. Triage Category.** Immediate.
- Rationale.** Presence of tourniquet requires immediate treatment even in the absence of arterial bleeding; delay in removing tourniquet will result in loss of limb; eyes need flushing immediately to preserve eyesight and prevent further injury; most urgent of the casualties.
- Treatment Steps.** (1) Remove tourniquet, flush eyes, and move to Delayed area; or (2) Remove tourniquet, flush eyes, and take to surgery.
- II. Triage Category.** Delayed.
- Rationale.** Life-threatening injuries take priority over limb- and eyesight-threatening injuries. This casualty has time-consuming injuries to treat, and there are limited personnel resources which are needed to treat other immediate casualties. Damage to the eyes is already done, and further delay will not worsen the casualty's condition.
- Treatment Steps.** Move to Delayed area and monitor periodically; assign someone (possibly a Minimal casualty) to stay with the blind casualty.

### **Additional Exercises:**

Trainers should use the *Treatment Briefs* in the 1994 draft of the *DEPMEDS Administrative Procedures and Clinical and Support Guidelines* to develop other scenarios with casualties who need to be triaged and treated. These *Treatment Briefs* include information that will enable trainers to develop detailed scenarios about casualties their personnel are likely to encounter in a field environment.

It is important that trainers develop and use these scenarios with their students. To be prepared to work in a mass casualty situation in a field environment, students need sufficient practice applying the principles of triage to casualties similar to those they are likely to encounter in a deployed status.

### **References**

DMSB. (1994). DEPMEDS administrative procedures and clinical and support guidelines (3rd ed. draft). Fort Detrick, MD: Author.\*

HQDA. (1995). Soldier's manual and trainer's guide: MOS 91B medical specialist, skill levels 1/2/3/4/5 (STP 8-91B15-SM-TG: Task 081-833-0080). Washington, DC: Author.

Wilford Hall Medical Center Medical Readiness Division. (1994). Medical readiness training: Provider handbook. Lackland Air Force Base, TX: Author.

\* Contact the Chief Nurse, FORSCOM, or the Chief, Department of Nursing Science, AMEDDC&S, for information about obtaining a copy of this document on disk (see Appendix D).

### **3.02: Intubate a Patient (91B)**

#### **Introduction:**

This task summary describes intubation of a patient in a field environment. Endotracheal intubation involves direct visualization of the larynx and placement of a tube into the trachea. An endotracheal airway is the most desirable way of achieving control over the airway. Ventilation can be achieved with 100% oxygen while simultaneously preventing aspiration of vomitus or other foreign substances.

An endotracheal (ET) tube is a flexible plastic tube open at either end. On the proximal end of the ET tube is a standard 15-mm adapter that connects to an oxygen-delivery device for positive-pressure ventilation. On the distal end of the ET tube is a balloon cuff that occludes the tracheal opening to prevent aspiration around the tube and minimize air leaks during ventilation. The markings on the ET tube indicate the tube's inner diameter in millimeters. The length of the tube from the distal end is indicated in centimeters at several levels.

A laryngoscope is required for visualizing the glottis. The laryngoscope handle contains batteries for the light source and attaches to a stainless steel blade that has a bulb near its distal end. When the blade is connected to the handle and elevated to a right angle, the blade snaps into place and the bulb lights. Two types of blades may be used: a straight blade (e.g., the Miller, Wisconsin, or Flagg) or a curved blade (e.g., the MacIntosh).

A stylet can be inserted through the ET tube before intubation to facilitate proper tube placement. Recession of the stylet tip is maintained by bending the end of the stylet over the rim of the adapter on the ET tube so the stylet does not advance beyond the tip of the tube during intubation and damage the mucosal surface or vocal cords.

Possible complications of intubation include (a) unrecognized misplacement of the ET tube into the esophagus or into the right main bronchus, (b) perforation of the pharynx, (c) pneumothorax or pneumomediastinum, (d) vocal cord damage, (e) hypoxia secondary to prolonged intubation attempts without intervening ventilation, and (f) spinal cord damage resulting from inadequate immobilization of the cervical spine during intubation in a patient with a pre-existing cervical spine injury.

## Task Summary:

### Conditions

You have an unconscious, non-breathing 27-year-old male patient (mannequin) with a patent airway but no gag reflex. Your partner is oxygenating the patient with a bag-valve-mask. You must prepare your equipment and intubate the simulated patient. You have the following equipment and supplies: 1 laryngoscope with 1 straight and 1 curved blade; 1 stylet; 1 each of 6, 7, & 8 mm ET tubes in sterile wrappers; a 10 cc syringe in a sterile wrapper; 1 roll of adhesive tape; 1 spray can or tube of lubricant that can be used to intubate the mannequin; 1 J tube; 1 intubation mannequin; 1 hospital bed; 1 stethoscope; 1 bag-valve mask.

### Standards

All steps necessary to prepare intubation equipment and establish an endotracheal (ET) airway are performed correctly IAW the references. The patient is not deprived of oxygen for longer than 20 seconds at any time during the procedure.

### Performance Measures

Go      No Go

#### I. Prepare Intubation Equipment

1. Attach blade to the laryngoscope as follows:
  - a. Hook blade to the connector on top of the laryngoscope.      —      —
  - b. Lift blade at a 90° angle to the laryngoscope, locking the blade in place.      —      —
  - c. If the light does not come on, replace the batteries and/or light bulb and re-test.  
(The light should be bright white and steady.)      —      —

**Note.** You can use either a curved or straight blade. In most cases, a curved blade is the easiest to use.

2. Select the 8 mm ET tube for the adult male (7.5 - 8 mm tube for the average adult male and 7 - 7.5 mm tube for the average adult female).      —      —

**Note.** Although the ET tube will pass through the contaminated mouth, the airway below the vocal cords is sterile. Therefore, efforts must be made to keep the distal end of the ET tube and cuff sterile.

3. Test the cuff to make sure it assumes a symmetrical shape and holds volume without leakage as follows:
  - a. Fill the 10-cc syringe with air and attach syringe to cuff valve on ET tube.      —      —
  - b. Inflate ET tube cuff with 10 cc of air by depressing the syringe plunger.      —      —

Performance Measures	Go	No Go
<b>Note.</b> Inflatable cuffs are used to attain an airtight seal, preventing aspiration. If the cuff leaks, another ET tube must be obtained, and the procedure must be repeated.		
c. Deflate cuff on ET tube by pulling the syringe plunger back until the plunger reaches the 10 cc mark on the syringe. Keep the syringe attached to the cuff valve.	—	—
4. Insert the stylet into the ET tube as follows:		
a. Insert stylet into the ET tube so the tip of the stylet is recessed 1/2 inch from the tip of the ET tube.	—	—
b. Bend the other end of the stylet at a 90° angle so the tip cannot advance past the end of the ET tube and puncture or lacerate the airway tissue.	—	—
<b>Note.</b> The stylet gives added rigidity to the ET tube and facilitates maintenance of the tube curvature.		
<b>Warning.</b> If the stylet protrudes beyond the end of the ET tube, it may damage the vocal cords and surrounding structures.		
5. Lubricate the ET tube prior to intubating mannequin (not necessary for intubation of a patient).	—	—
6. Prepare strips of tape of the appropriate length for securing the ET tube in place. Alternately, umbilical tape cut in 30-inch lengths can be used to tie the ET tube in place--a technique that is preferable to taping in the field if umbilical tape is available.	—	—
<b>Note.</b> While you are preparing your equipment, your partner should be ventilating the patient with 100% oxygen. He should also remove the patient's dentures or partial plates, if present, before you start the intubation procedure.		

Performance Measures	Go	No Go
<b>II. Perform Intubation</b>		
1. Put on gloves.	—	—
2. Make sure the patient has been oxygenated for 2 to 3 minutes prior to intubation.	—	—
3. If the cervical spine is not injured, position the patient by flexing his neck forward and his head backward so he is in the "sniffing position." It may be helpful to place a folded towel under the patient's neck and shoulders.	—	—

Performance Measures	Go	No Go
4. Open patient's mouth with the right hand by placing crossed fingers on the patient's teeth. Hold the mouth open.	—	—
<b>Note.</b> Crossing the thumb and index fingers improves leverage.		
5. Insert laryngoscope blade as follows:		
a. Stand at the top of the patient's head.	—	—
b. Hold laryngoscope with the left hand.	—	—
c. Open and lock blade at a 90° angle to turn the light on.	—	—
<b>Note.</b> Your partner can apply cricoid pressure (Sellick's maneuver) during intubation to occlude the esophagus and prevent vomiting/aspiration of gastric contents and/or esophageal intubation. (When performing intubation in the field on an unconscious patient whose history is unknown, one should assume that the patient has a "full stomach" and use cricoid pressure.) One method of applying cricoid pressure is for your partner to place his thumb and index finger on the cricoid cartilage and exert pressure in an anteroposterior direction, occluding the esophagus. Cricoid pressure should be maintained until proper placement of the ET tube is assured. Note that if active vomiting occurs, cricoid pressure must be released immediately or there is danger of esophageal rupture.		
d. Place blade into the right side of the patient's mouth.	—	—
e. Move laryngoscope to the center of the patient's mouth by moving the tongue to the left side with the laryngoscope blade.	—	—
f. Advance the blade a short distance to visualize the epiglottis.	—	—
6. Open the epiglottis and visualize the vocal cords as follows:		
a. Slowly advance the blade--the curved blade to the vallecula (the space between the epiglottis and the base of the tongue) and the straight blade beneath the epiglottis.	—	—
b. With the laryngoscope in the center of the patient's mouth, pull along the line of the handle to lift the patient's tongue and epiglottis out of the line of vision so you can see his larynx.	—	—
<b>Warning.</b> Be careful not to damage any of the patient's soft tissues. Do not apply pressure to the teeth or dentures.		

### Performance Measures

Go      No Go

- c. Exert gentle traction on the laryngoscope upward and forward at a 45° angle to the floor. As the epiglottis is lifted forward, the vertical opening of the larynx between the vocal cords will come into view. (It may be necessary to suction any secretions that obscure your view.)      \_\_\_\_\_
- 7. Under direct vision, insert the ET tube with the right hand, from the right corner of the patient's mouth, through the vocal cords until the cuff is just below the level of the vocal cords.      \_\_\_\_\_

**Note.** Do not insert the ET tube if you cannot see the vocal cords. An ET tube shoved blindly down the throat usually will come to rest in the esophagus, not the trachea. The only way to be certain that the tube has passed through the vocal cords is to see it pass through the vocal cords.

- 8. When you have seen the cuff of the ET tube pass about 1 inch (not more) beyond the vocal cords, place the laryngoscope back on your work surface and hold the tube securely in place with your left hand.      \_\_\_\_\_
- 9. While holding the ET tube with your left hand, pull the stylet straight out with your right hand.      \_\_\_\_\_
- 10. Once the ET tube has been inserted, inflate the cuff as follows:
  - a. Ask your partner to depress the plunger of the syringe, injecting air to inflate the cuff. Continue ventilating the patient while the cuff is being inflated. Before the cuff is inflated, you will hear a leakage of air around the ET tube. The cuff should be inflated only until that leakage ceases.      \_\_\_\_\_
  - b. Hold cuff valve in one hand and remove the syringe with the other hand.      \_\_\_\_\_
- 11. Check the placement of the ET tube as follows:
  - a. Hold the ET tube securely in place with your left hand and attach resuscitative equipment, such as a bag-valve, to the ET tube with your right hand. The bag-valve should be connected to an oxygen cylinder, with a flow rate of at least 8 liters per minute.      \_\_\_\_\_
  - b. While you ventilate through the ET tube, observe the patient's chest to see whether it rises and falls with each ventilation.      \_\_\_\_\_
  - c. At the same time, instruct your partner to auscultate both sides of the patient's chest to determine whether breath sounds are audible and equal on both sides as follows:

Performance Measures	Go	No Go
(1) If the patient's chest rises symmetrically, breath sounds are heard in both lungs, and no abnormal sounds are heard over the epigastric area, the ET tube is in proper position.	____	____
(2) If breath sounds are audible on only one side of the chest (usually the right) or are much louder on one side of the chest, the ET tube has probably been inserted too far and has entered a main bronchus. In this case, pull back on the ET tube very slowly while you continue to ventilate until your partner reports that he can hear breath sounds on both sides of the chest.	____	____
<b>Note.</b> A mis-placed ET tube is most likely to be in the right main stem bronchus.		
(3) If a rushing sound is heard over the epigastric area and/or breath sounds are absent bilaterally when you ventilate through the ET tube, it is likely that you have intubated the esophagus rather than the trachea. Deflate the cuff, withdraw the ET tube completely, ventilate the patient with 100% oxygen, and wait at least 3 minutes before making another attempt to intubate the patient.	____	____
12. After correct placement of the ET tube has been determined, re-oxygenate the patient by giving 2 slow breaths through the ET tube.	____	____
13. While holding the ET tube securely in place, wedge a bite block between the back teeth or insert an oropharyngeal airway. (Either of these devices prevents the patient from biting down on the ET tube.)	____	____
14. Secure the ET tube in place as follows:		
a. When the patient's face is dry and clean, wrap the middle of a long piece of tape around the ET tube and attach each end of the tape to the patient's face. If available, benzoin may be used as a skin adhesive to permit good taping of the tube.	____	____
b. When in the field and securing the ET tube on patients whose face is injured, bloody, and/or unclean, you can do a better job of securing the ET tube in place if you use umbilical tape. Tie the tape around the ET tube, pull it tight, and tie it behind the patient's neck.	____	____
<b>Note.</b> Never take your hand off the ET tube before it has been secured with tape or ties. Even then, it is a good idea to support the tube manually while you ventilate the patient. You do not want a sudden jolt to the bag-valve device to yank the ET tube from its place.		

Performance Measures	Go      No Go
c. Mark the point at which the ET tube emerges from the patient's mouth to enable medical personnel to determine later whether the tube has slipped in or out.	— —
<b>Warning.</b> An intubation attempt should not take more than 20 seconds. If you are unable to accomplish intubation in this period, withdraw the laryngoscope, and ventilate the patient for a few minutes with 100% oxygen before trying again. One way to keep track of the time elapsed during an intubation attempt is to hold your own breath. When you become uncomfortable from lack of oxygen and accumulation of carbon dioxide, you may be certain the patient's tissues are at least as uncomfortable. So breathe again, and do likewise for the patient.	
15. Once the ET tube has been secured in place, ventilate the patient once every 3 to 5 seconds.	— —
16. Check that correct tube placement is maintained by auscultating the lungs and epigastric area.	— —
17. Record the procedure.	— —
<b>OVERALL EVALUATION</b>	

#### Written Exercises:

1. Insert the stylet into the ET tube so the tip of the stylet is \_\_\_\_\_ from the tip of the ET tube.
2. Insert the ET tube into the trachea until \_\_\_\_\_.
3. Why is it important to listen to breath sounds after ET tube placement?
4. When do you re-oxygenate a patient during the intubation procedure?

### References

AMEDD Noncommissioned Officer Academy. (1993). BNCOC technical training (Module L. Respiratory system). Fort Sam Houston, TX: 232nd Medical Battalion.

Barash, P. G., Cullen, B. F., & Stoelting, R. K. (Eds.). (1992). Clinical anesthesia (2nd ed.). Philadelphia: J. B. Lippincott.

Campbell, J. E. (Ed.). (1988). Basic trauma life support: Advanced prehospital care (2nd ed.). Englewood Cliffs, NJ: Prentice Hall.

HQDA. (1995). Soldier's manual and trainer's guide: MOS 91B medical specialist, skill levels 1/2/3/4/5 (STP 8-91B15-SM-TG: Tasks 081-830-3014, 081-830-3015 & Task 081-830-3016). Washington, DC: Author.

Suddarth, D. S. (Ed.). (1991). Lippincott manual of nursing practice (5th ed.). Philadelphia: J. B. Lippincott.

### **3.03: Perform a Needle Chest Decompression (91B)**

#### **Introduction:**

This task summary describes performance of a needle chest decompression in a field environment. Pneumothorax is defined as the presence of air within the pleural space. Air may enter the pleural space (a) from the lungs through a rupture or laceration or (b) from the outside through a sucking chest wound.

Tension pneumothorax is any type of pneumothorax in which intrapleural pressure is greater than atmospheric pressure. It is caused by a leak of air into the pleural space through a defect that acts as a one-way valve. Air enters the pleural space during inhalation but cannot escape during exhalation. Therefore, pressure is built up in the affected pleural space.

Trapped air in the pleural space compresses the lung beneath it. Unrelieved pressure will push the contents of the mediastinum in the opposite direction, away from the side of the tension pneumothorax. Ventilation and circulation are impaired. The superior and inferior vena cava become kinked and compressed. This hinders the return of blood to the right side of the heart, causing blood to back up into the systemic veins. This is considered a true medical emergency.

Chest decompression is used to remove air from the chest cavity. This allows expansion of the lung and reduction of pressure in the chest cavity. Needle chest decompression is performed when there is an indication for chest decompression but adequate equipment, supplies, and/or personnel are not available to perform regular chest tube insertion.

The conservative management of tension pneumothorax is oxygen, ventilatory assistance, and rapid transport. The indication for performing emergency field chest decompression is the presence of a tension pneumothorax and any one of the following: (a) respiratory distress and cyanosis, (b) loss of the radial pulse, or (c) loss of consciousness.

Complications of chest decompression include (a) laceration of the intercostal vessel with resultant hemorrhage due to poor needle placement, (b) creation of a pneumothorax if one is not already present, (c) laceration of the lung due to poor technique or inappropriate insertion, and (d) infection due to inadequate skin preparation.

## **Task Summary:**

### **Conditions**

You are a combat medic in a forward area and have an unconscious patient (mannequin) with left chest trauma, severe respiratory distress, and cyanosis. Your partner is giving the patient supplemental oxygen. You must check the patient for signs of a tension pneumothorax. Once you find indications of a tension pneumothorax, you must perform a needle chest decompression. You have the following equipment and supplies: 1 each of a 14 & 18 gauge angiocath or needle in a sterile wrapper; a 20 cc syringe in a sterile wrapper; 1 box of sterile alcohol pads; 1 roll of adhesive tape; 1 condom or sterile glove; 1 mannequin with chest landmarks visible; 1 hospital bed. No underwater seal drainage system is available.

### **Standards**

All steps necessary to check a patient for signs of a tension pneumothorax and to perform a needle chest decompression are performed IAW the references.

### **Performance Measures**

**Go      No Go**

1. Verify the presence of a tension pneumothorax by checking for indications of the condition as follows:
  - a. Look and listen for signs of dyspnea and progressive respiratory distress despite an open airway. This includes anxiety, cyanosis, and tachypnea. \_\_\_\_\_
  - b. Look for decreased movement and increased chest size on the affected side during expiration as follows:
    - (1) Place one hand on the affected side and the other hand on the unaffected side of the chest.
    - (2) Determine if the height of the hand on the affected side is greater during expiration than the height of the hand on the unaffected side. \_\_\_\_\_
  - c. Assess breath sounds as follows:
    - (1) Auscultate both sides of the chest, listening for absent/decreased breath sounds on the affected side. \_\_\_\_\_
    - (2) If breath sounds are unequal, percuss both sides to check for hyperresonance to percussion on affected side. \_\_\_\_\_
  - d. Look, listen, and feel the patient's chest for signs of subcutaneous emphysema (which may extend above the clavicles) as follows:
    - (1) Soft-tissue crepitus. \_\_\_\_\_
    - (2) Crackling sound (occasionally) on palpation. \_\_\_\_\_
    - (3) Feels like rice krispies under the skin. \_\_\_\_\_

Performance Measures	Go	No Go
e. Look for the following signs of shock: (1) Tachycardia. (2) Hypotension with narrowing pulse pressure. (3) Cool, clammy skin.	—	—
f. Look for mediastinal shift manifested as jugular distension and/or tracheal deviation away from side of injury.	—	—
<b>Note.</b> Tracheal deviation is a late sign that indicates substantial mediastinal shifting.		
<b>Warning.</b> Correct assessment is essential. Insertion of a needle into the pleural space of a non-affected person will result in pneumothorax.		
2. Position the patient. Semi-Fowler's position may be used if a cervical-spine fracture has been ruled out.	—	—
3. Locate the insertion site as follows: a. Locate the sternomanubrial junction (Angle of Louis). b. From the sternomanubrial junction, follow the adjacent intercostal space (ICS) to the midclavicular line on the same side as the pneumothorax.	—	—
<b>Note.</b> The preferred entry site is the 2nd ICS in the midclavicular line (approximately in line with the nipple) on the affected side of the patient's chest. An alternate entry site is the 4th or 5th ICS in the midaxillary line on the affected side.		
4. Thoroughly clean a 3 to 4 inch area around the insertion site with a sterile alcohol wipe, beginning in the center and working outward using a circular motion.	—	—
<b>Note.</b> Always provide the optimum conditions the situation allows. Therefore, if there is time and the situation permits, use a mask and sterile gloves for the procedure.		
5. Insert a large bore (10 to 14 gauge) needle (with or without a 20 cc syringe attached) or a catheter-over-needle as follows: a. Place the needle tip, bevel up, on the insertion site, centered over the 3rd rib. b. Lower the proximal end of the needle to permit the tip to enter the skin just above the 3rd rib margin. c. Firmly insert the needle into the skin over the 3rd rib until the pleura has been penetrated, as evidenced by feeling a "pop" when the needle enters the pleural space.	—	—
<b>Warning.</b> Proper positioning of the needle just over the rib is essential to avoid puncturing blood vessels and/or nerves which ride just below the lower rib margin.		

Performance Measures	Go	No Go
6. Decompress the affected side as follows:		
a. If using a needle and syringe, aspirate air with syringe to relieve the patient's acute symptoms.	—	—
b. If using a catheter-over-needle, hold the needle still and push the catheter into the pleural space until resistance is felt. Withdraw the needle along the angle of insertion while holding the catheter still.	—	—
c. If a three-way stopcock is used, additional air can be aspirated from the pleural cavity by turning the stopcock lever to allow expulsion of air from the syringe.	—	—
<b>Note.</b> There will be an initial rush of air when the needle enters the pleural space. Occlude the needle during inspiration to prevent a reaccumulation of air in the pleural space.		
7. Secure the needle or catheter to the chest with tape.	—	—
8. Improvise and apply a one-way flutter valve (to allow positive pressure in the chest to escape so the lung can reexpand) as follows:		
a. Cut a small hole in the tip of a condom or the finger casing of a sterile glove. Rinse the condom or glove finger in sterile water or normal saline if available.	—	—
b. Tie or tape the condom or finger tip to the needle or catheter hub.	—	—
c. Check the operation of the improvised flutter valve as follows:	—	—
(1) On expiration, air should pass out through the needle-valve assembly and improvised flutter valve.	—	—
(2) On inspiration, the improvised flutter valve should collapse against itself and the needle hub to prevent entry of air into the pleural cavity.	—	—
<b>Note.</b> Use of a condom for improvising a one-way flutter valve is preferred over a sterile glove because of powder in the glove that possibly could enter the needle or catheter. Instead of improvising a flutter valve, the Heimlich valve (which is a commercial one-way flutter valve) can be used if available.		
9. Record treatment on the Field Medical Card.	—	—
<b>OVERALL EVALUATION</b>	—	—

**Written Exercises:**

1. List 3 signs and/or symptoms of a tension pneumothorax.
2. List 3 indications for performing emergency field decompression in the presence of a tension pneumothorax.
3. List 4 possible complications of needle chest decompression.
4. Describe an appropriate insertion site for performing a needle chest decompression.
5. Describe the proper technique for inserting the needle to avoid puncturing blood vessels and/or nerves.
6. Describe how to improvise a one-way flutter valve.
7. A \_\_\_\_\_ valve is a commercial one-way flutter valve.

**References**

- AMEDD Noncommissioned Officer Academy. (1993). BNCOC technical training (Module L. Respiratory system). Fort Sam Houston, TX: 232nd Medical Battalion.
- Campbell, J. E. (Ed.). (1988). Basic trauma life support: Advanced prehospital care (2nd ed.). Englewood Cliffs, NJ: Prentice Hall.
- HQDA. (1995). Soldier's manual and trainer's guide: MOS 91B medical specialist, skill levels 1/2/3/4/5 (STP 8-91B15-SM-TG: Task 081-833-3007). Washington, DC: Author.

### **3.04: Treat a Hemorrhaging Patient (91B)**

#### **Introduction:**

This task summary describes treating a patient who has external hemorrhaging in a field environment. Hemorrhage is excessive bleeding. Two natural body responses to bleeding are blood clotting and constriction of blood vessels. The purpose of applying a sterile dressing with pressure to a hemorrhaging wound is to assist in (a) clot formation, (b) vessel compression, and (c) protection from infectious organisms. Hard pressure on the dressing over the wound may be required for several minutes.

Hemorrhage, especially venous bleeding, can be reduced by raising the wounded limb to a level above the heart. Elevation may be used before, during, or after application of a pressure dressing. Serious hemorrhage may require simultaneous application of elevation, dressing, and pressure.

A pressure point is a place where a main artery supplying the wounded area lies near the skin surface and over a bone. Pressure at these points is applied with the fingers, thumbs, or hands. The object of the pressure is to occlude the artery between the wound and the heart by compressing the artery against the bone to stop blood flow from the heart to the wound.

A tourniquet is a constricting band placed around the circumference of one of the extremities to stop hemorrhage. The tourniquet is used as a LAST resort; other control measures must be used FIRST. The application of a tourniquet must represent a choice between saving a life and saving a limb. Once a tourniquet has been applied, it must be left in place until it is removed by a physician or physician assistant.

#### **Task Summary:**

##### **Conditions**

You are working as a combat medic during a field training exercise. A soldier has a wound on the left lower arm, just below the elbow. The wound is bleeding profusely. You must take the necessary steps to treat the soldier. The wound continues to hemorrhage as you take each step. You have the following equipment and supplies: 2 field dressings (NSN 6510-00-159-4883); 2 field bandages (NSN 6510-00-201-1755); 3 tongue blades; 1 mannequin with wound marked on forearm, just below elbow joint; 1 hospital bed.

##### **Standards**

You must take appropriate steps IAW the references to control the external hemorrhaging as the wound continues to bleed.

Performance Measures	Go	No Go
1. Tear, cut, or lift clothing or other material from the wound without causing additional injury to the patient.	—	—
<b>Note.</b> Clothing or anything else stuck to the wound should be left alone to avoid injury. Do not attempt to clean the wound.		
2. Apply a field dressing as follows:		
a. Grasp olive drab tails of dressing with 2 hands and pull dressing open over the wound with the white side down.	—	—
b. Use one hand to hold the dressing in place and the other hand to wrap one of the tails around the injury.	—	—
c. Wrap the other tail in the opposite direction until remainder of dressing is covered and secured to the body.	—	—
d. Tie the tails into a nonslip knot over the outer edge of the dressing, <u>not</u> over the wound.	—	—
e. Check the dressing to make sure that it is tied firmly enough to prevent slipping without causing a tourniquet-like effect.	—	—
<b>Warning.</b> The dressing should be tied firmly enough to be secure, but loosely enough to be able to insert 2 fingers between the knot and dressing. The dressing should not have a tourniquet-like effect.		
3. Apply direct manual pressure over the dressing for 5-10 minutes to control the bleeding.	—	—
4. Elevate the injured part above the level of the heart. A blanket, poncho, log, or any other available material can be used to elevate the injury.	—	—
<b>Note.</b> A suspected fractured limb must be splinted before the limb is elevated.		
5. If hemorrhaging continues, apply and secure a pressure dressing as follows:		
a. Keeping the injured limb elevated, place a wad of padding directly over the wound. For example, form the second field dressing into bulky material and place on top of the original dressing.	—	—
b. Wrap the field bandage around the bulky material, leaving enough ends to tie a knot.	—	—
c. Tie the ends in a nonslip knot directly over the wound, securing the extra padding.	—	—

Performance Measures	Go	No Go
d. The pressure dressing should be tight enough so that only the tip of 1 finger can be inserted between the dressing and the skin, but the dressing should not have a tourniquet-like effect.	—	—
6. If hemorrhaging continues, apply digital pressure to the arterial pressure point. (See FM 8-230 for a description of pressure points.)	—	—
<b>Note.</b> Use a tourniquet only when all other measures (pressure dressing, elevation of limb, and pressure points) have failed to control the hemorrhaging.		
7. If still unable to control the bleeding, apply a tourniquet between the injury site and the heart as follows:		
a. Use a strip of cloth to make a tourniquet at least 1-2 inches wide. In the absence of an issue tourniquet, an improvised tourniquet can be made from strong, soft, pliable material such as gauze, broadcloth bandage, clothing, or kerchiefs. If gauze bandage is used, a 3-4 inch width is preferable to the 2 inch width.	—	—
<b>Warning.</b> Do not use wire or shoestrings for a tourniquet band.		
b. Place tourniquet over the smoothed sleeve or trouser leg, if possible.	—	—
c. Place tourniquet around the limb at least 2 inches above the wound, between the wound and the heart, but not on a joint or directly over a wound or fracture. The tourniquet should not touch wound edges. For wounds just below a joint, place the tourniquet above the joint.	—	—
d. Tie tourniquet with a half knot.	—	—
e. Place a rigid object (e.g., tongue blades) on top of the half knot.	—	—
f. Tie a square knot over the tongue blades.	—	—
g. Tighten tourniquet by twisting tongue blades until the bright red bleeding has stopped.	—	—
<b>Note.</b> In the case of a large wound or an amputation, oozing of dark blood may continue for a short time.		
h. Secure tongue blades in this position, using the ends of the field bandage or another piece of cloth as long as the tongue blades do not unwind.	—	—
i. Do not cover the tourniquet; leave it in full view.	—	—
<b>Note.</b> If a limb is completely amputated, the stump should be padded and bandaged.		

Performance Measures	Go	No Go
8. Mark a 'T' on patient's forehead to indicate a tourniquet is in place, and mark time of initiation on forehead or on Field Medical Card. (Use a pen, mud, the casualty's blood, or whatever is available.)	—	—
<b>OVERALL EVALUATION</b>	—	—

**Written Exercises:**

1. Describe 3 purposes of applying a sterile dressing with pressure to a hemorrhaging wound.
  
  
  
  
  
  
2. When can you elevate the wounded limb in relation to applying a pressure dressing?
  
  
  
  
  
  
3. What is a pressure point?
  
  
  
  
  
  
4. Describe the location of 3 pressure points on the body.

5. Describe the appropriate location of a tourniquet (a) for a hemorrhaging wound on the upper leg and (b) for a hemorrhaging wound on the lower leg, just below the knee.
  6. What are 2 indications that you have applied a tourniquet with enough pressure to stop blood from passing under it?
  7. When should you remove a tourniquet that has been placed on a limb for the purpose of controlling hemorrhaging?

## References

HQDA. (1984). Field manual: Medical specialist (FM 8-230, pp. 13-80 to 13-86). Washington, DC: Author.

HQDA. (1990). Military qualification standards I: Manual of common tasks (STP 21-I-MQS: Tasks 04-8310 00-3010 & 04-8310 00-3011). Washington, DC: Author.

### **3.05: Administer Blood to a Patient (91B, 91C)**

#### **Introduction:**

This task summary describes the administration of blood to a patient in a field environment. A blood transfusion is the introduction of blood or blood components (e.g., packed red blood cells) into the venous circulation. Transfusion reactions and/or complications usually occur when the wrong type of blood has been given, when excessive volume has been given, or when the blood has been given too fast. Following is a brief overview of five types of acute blood product reactions:

#### **1. Febrile reaction -- non-hemolytic.**

- a. This is the most common blood transfusion reaction. It results from a hypersensitivity to donor white blood cells, platelets, or plasma proteins. Note that what is thought to be a febrile reaction can actually signify a hemolytic reaction or bacterial contamination.
- b. Signs and symptoms generally occur within about 30 minutes but can occur 1-2 hours after a transfusion. They include the following:
  - (1) "Sudden" temperature increase of 1°F or more but temperature is less than 101°F.
  - (2) May see sudden shaking chills, headache, flushing, and/or anxiety.
  - (3) Stable vital signs with exception of temperature.
  - (4) Will see progressive signs of shock if a bacterial or hemolytic reaction is occurring.
- c. Management includes the following:
  - (1) Stop transfusion, change tubing, maintain venous access, and notify the charge nurse and/or physician.
  - (2) ASA or acetaminophen for fever as directed.
  - (3) Check vital signs every 15 to 30 minutes.
  - (4) Document episode, time, amount of blood given, and treatment.

#### **2. Acute hemolytic reaction.**

- a. Hemolytic transfusion reactions are one of the main causes of death associated with transfusions. An acute hemolytic reaction is the result of an ABO mismatch or Rh incompatibility.
- b. Onset of symptoms occurs almost immediately and can be misleadingly mild. Signs and symptoms include the following:
  - (1) Most common initial sign is vague uneasiness usually accompanied by fever, chills, nausea, and flushing.
  - (2) Headache, anxiety, dyspnea, precordial pain.
  - (3) Pain in thighs and lower back.
  - (4) Increased pulse and increased respiratory rate.

- (5) Hypotension, vascular collapse, shock.
- (6) Hemoglobinuria (dark urine).
- (7) May progress to acute renal failure (characterized by oliguria, anuria), frank bleeding, death.

c. Management includes the following:

- (1) Stop the transfusion immediately! Change the tubing but maintain venous access. In the hospital/clinic setting, send a fresh blood sample and urine sample from the recipient to the lab for testing by the blood bank. Also send the remainder of the blood component unit to the blood bank.
- (2) Vigorous hydration as ordered and oxygen therapy.
- (3) Administer prescribed medications as ordered, including diuretics, bicarbonate IV, Benadryl.
- (4) Monitor vital signs and urine output.

3. Pyrogenic or septic reaction.

a. Caused by bacterial contamination of the blood or blood products. Mortality rate is high. Signs and symptoms can occur during the transfusion or 30-60 minutes after the transfusion is completed and include the following:

- (1) Rapid onset of chills, high fever.
- (2) Vomiting, diarrhea.
- (3) Marked hypotension.

b. Management includes the following:

- (1) Stop transfusion, change tubing, maintain venous access, and notify the charge nurse and/or physician.
- (2) Obtain cultures of patient's blood and return blood bags with administration set to the blood bank for culture.
- (3) Treat septicemia as directed--antibiotics, IV fluids, vasopressors, steroids.

4. Allergic reaction.

a. Occurs when there is an allergic response (hypersensitivity) to substances in the donor blood. More common with multiple transfusions and in patients who have a history of allergies. An allergic reaction can occur anytime during the transfusion or 1-2 hours after the transfusion is completed. May be mild or life-threatening.

b. Mild allergic reaction.

- (1) Signs and symptoms include rash, itching, urticaria, and sometimes also mild fever.
- (2) Management includes the following:
  - (a) Stop transfusion, change tubing, maintain venous access, and notify the charge nurse and/or physician.

- (b) Administer Benadryl as directed.
  - (c) Maintain the IV line with Normal Saline (or may change to Ringer's Lactate if suspect more severe reaction in progress).
  - (d) Administer ASA or Tylenol for fever as directed.
  - (e) Observe for anaphylaxis.
- c. Severe allergic reaction (anaphylactic type).
- (1) Most of these reactions occur in patients sensitized by previous transfusions or pregnancy.
  - (2) Distinguished from other reactions in that it occurs after only a few ml of blood or plasma infused and there is no fever.
  - (3) Signs and symptoms include the following:
    - (a) Wheezing, coughing.
    - (b) Tracheal edema, respiratory distress.
    - (c) Nausea, vomiting, diarrhea, abdominal cramps.
    - (d) Anaphylactic shock.
  - (4) Management includes the following:
    - (a) Stop transfusion, change tubing, maintain venous access, and notify the charge nurse and/or physician.
    - (b) IV fluids at a rate to support BP as directed.
    - (c) Administer prescribed medications as directed, including epinephrine, Benadryl, aminophylline.
- d. Do not restart the transfusion after an apparent anaphylactic reaction.
5. Circulatory overload.
- a. Caused by blood being administered at a rate or volume greater than the circulatory system can accommodate. Note that a rapid increase in blood volume is poorly tolerated by patients with compromised cardiac or pulmonary status. Can be life-threatening.
  - b. Signs and symptoms can occur during or soon after the transfusion and include the following:
    - (1) Dyspnea, coughing, cyanosis.
    - (2) Headache, sudden anxiety.
    - (3) Significant increase in systolic BP, distended neck veins.
    - (4) Rales at base of lungs.
  - c. Management includes the following:
    - (1) Stop transfusion, change tubing, maintain venous access, and notify the charge nurse and/or physician.
    - (2) Place patient in sitting (Fowler's or semi-Fowler's position).
    - (3) Administer oxygen, diuretics, analgesics, aminophylline as directed.

## Task Summary:

### Conditions

You are working in the EMT of a field MTF. You have just received a unit of blood that you must administer to a patient. You have verified a physician's order requiring the administration of blood and have explained the procedure to the patient. You have the following equipment and supplies: 1 labeled blood pack filled with red fluid to simulate blood; 1 SF 518 completed with patient information; 1 blood transfusion 'Y' recipient set; 1 liter of IV normal saline; 1 liter of any IV solution except normal saline; 1 large basin in which to set the blood pack and IV bag between use; 1 IV pole; 1 hospital bed.

### Standards

Perform all steps necessary to safely administer blood to a patient IAW the references.

### Performance Measures

Go      No Go

1. Verify and inspect the blood pack received from the laboratory as follows:

a. Record time the blood pack was received on the requisition form (SF 518).      —      —

**Note.** Infusion of a blood pack should be initiated within 30 minutes of being issued.

b. Together with an RN, verify and match information on the blood pack label with data on SF 518.      —      —

c. Inspect blood for abnormalities such as abnormal color, clots, excess air, gas bubbles or black or gray colored sediment.      —      —

**Note.** Return the blood pack to the blood bank if any abnormality is present or suspected.

d. Together with the same person, match information on the blood pack with patient's identification, to include patient's name, blood type, and identification number.      —      —

**Note.** Once all administrative data have been verified and the blood inspected, the SF 518 is signed IAW local policy.

**Warning.** Most serious transfusion problems are caused by human error such as mistaken identity of the specimen, blood unit, or patient. It is critical that both blood product and patient verification be done to prevent acute blood transfusion reactions and/or complications caused by human error.

2. Obtain baseline data as follows:

a. Reconfirm data from the patient's history regarding allergies or previous reactions to blood products.      —      —

Performance Measures	Go	No Go
b. Measure and evaluate vital signs	—	—
c. Record vital signs on SF 518 and on medical treatment record.	—	—
3. Prepare blood and blood recipient set as follows:		
a. Put on gloves.	—	—
b. Close all three clamps on the "Y" tubing.	—	—
<b>Warning.</b> Use only tubing that is designed for the administration of blood products. It is equipped with a filter designed for the fine filtration required for blood products.		
c. Aseptically insert one of the tubing spikes into the container of normal saline. Invert and hang this container about 3 feet above the level of the patient.	—	—
d. Open clamp on the normal saline line and prime the upper line and the blood filter.	—	—
<b>Note.</b> When filling the filter chamber, make sure that the level of saline is above the top of the filter. This decreases hemolysis caused by cells striking the filter.		
e. Open clamp on the empty line on which the blood will be hung. Normal saline will flow up the empty line to prime that portion of the tubing.	—	—
<b>Note.</b> Use only 0.9% normal saline for injection with blood. Other solutions and all medications are incompatible with blood products. They may cause agglutination (clumping) and/or hemolysis (destruction) of the donor cells.		
f. Once the blood line is primed with saline, close the clamp on the blood line.	—	—
g. Leave the clamp on the normal saline line open and open the main roller clamp to prime the lower infusion tubing.	—	—
h. Close the main roller clamp after the main tubing is primed.	—	—
i. Aseptically expose the blood port on the blood pack.	—	—
j. Aseptically insert the remaining spike into the blood port and hang the blood at the same level as the normal saline container.	—	—
<b>Note.</b> If "Y" type recipient tubing is not available, use regular infusion tubing for the normal saline and the available blood recipient tubing for the blood pack. Prime each set. Attach a sterile, large bore (18 gauge or larger) needle to the end of the blood tubing and "piggyback" the blood into the normal saline line below the level of the roller clamp. Hang the blood pack at least 6 inches higher than the normal saline.		

Performance Measures	Go	No Go
4. Check that a venipuncture has been performed using a large gauge (18 gauge or larger) IV catheter to enhance the flow of blood and prevent hemolysis of the cells.	—	—
5. Begin the infusion of blood as follows:		
a. Attach the primed infusion set to the IV catheter, tape it securely, and open the main roller clamp.	—	—
<b>Note.</b> If a preexisting catheter is being used, run in 50 cc of normal saline to flush out any incompatible solution. If a new catheter was inserted, this step is not required.		
b. Close the roller clamp to the normal saline and open the roller clamp to the blood.	—	—
c. Adjust the flow rate with the main roller clamp as follows:		
(1) Set the flow rate to deliver approximately 10 to 25 cc of blood over the first 15 minutes.	—	—
<b>Note.</b> When delivering blood by piggyback, begin the infusion by opening the roller clamp on the normal saline line and setting it to a TKO rate. Adjust the roller clamp on the blood line to deliver 10 to 25 cc of blood over the first 15 minutes.		
(2) Monitor the vital signs closely for the first 15 minutes and observe for indications of an adverse reaction to the blood. (See signs and symptoms of adverse reactions in the introduction.)	—	—
<b>Warning.</b> Any time an adverse reaction is suspected, immediately stop the blood, change the tubing, and infuse normal saline. Notify the charge nurse and physician immediately.		
(3) Set the main roller clamp to deliver the prescribed flow rate if, after the first 15 minutes, no adverse reaction is suspected and the vital signs are stable.	—	—
<b>Note.</b> See the task summary for the skill, "Calculate the Flow Rate for an IV Infusion," to obtain a formula for calculating the flow rate for the blood transfusion.		
6. Monitor and evaluate the patient throughout the procedure as follows:		
a. Monitor vital signs every hour or more frequently IAW unit SOP.	—	—
b. Compare vital signs with previous and baseline vital signs.	—	—
c. Observe for changes that indicate an adverse reaction to the blood.	—	—
d. If an adverse reaction is suspected, stop the blood, change the tubing, infuse normal saline, and notify the charge nurse and/or physician.	—	—

Performance Measures	Go      No Go
<b>Warning.</b> When a transfusion reaction occurs or is suspected, the unused blood and recipient tubing must be sent to the laboratory along with a 10 ml specimen of the patient's venous blood and a post transfusion urine specimen.	
7. Discontinue the infusion of blood as follows:	
a. When the blood pack has emptied, close the clamp to the blood and open the clamp to the normal saline.	— —
b. Flush tubing and filter with approximately 50 cc of normal saline to deliver the residual blood.	— —
c. After the residual blood has been infused, run normal saline at a TKO rate or hang another prescribed IV fluid.	— —
(1) Disconnect blood recipient set from IV catheter.	— —
(2) Connect new administration set with the prescribed fluid to the catheter.	— —
(3) Set flow rate.	— —
d. Take and record vital signs at completion of the transfusion and one hour after completion.	— —
<b>Note.</b> As a rule, a unit of blood should be infused within 2 to 4 hours unless contraindicated by risk of circulatory overload.	
8. Return used blood pack to the laboratory blood bank with a copy of SF 518 or dispose of it IAW unit SOP.	— —
9. Document the procedure and significant nursing observations on the appropriate forms IAW unit SOP.	
a. Complete the SF 518.	— —
(1) Return one copy to the laboratory blood bank.	— —
(2) Place one copy in the patient's record.	— —
b. Record the procedure and the patient's response to the blood transfusion.	— —
<b>OVERALL EVALUATION</b>	— —

**Written Exercises:**

1. List 5 signs and symptoms of an acute reaction to a blood transfusion.
2. When can an acute reaction to a blood transfusion occur?
3. What actions should you take when a patient exhibits signs of an acute reaction to a blood transfusion?
4. Describe what you should do to verify and inspect the blood pack before administering it to a patient.
5. What baseline data should you collect from a patient before administering blood?
6. What type of IV fluid should you use for infusion with the blood and why would you use this IV fluid?

7. Describe how you would administer blood to a patient when "Y" type recipient tubing is not available.
  
  
  
  
  
  
  
  
  
8. What gauge IV catheter can you use to administer blood to a patient?
  
  
  
  
  
  
  
  
  
9. What volume of blood should you administer to a patient over the first 15 minutes of the transfusion and why?
  
  
  
  
  
  
  
  
  
10. Describe what actions you would take when discontinuing the blood transfusion.

#### References

- AMEDD Noncommissioned Officer Academy. (1993). BNCOC technical training (Module E. Pharmacology). Fort Sam Houston, TX: 232nd Medical Battalion.
- HQDA. (1990). Soldier's manual and trainer's guide: MOS 91C practical nurse, skill levels 2/3/4/5 (STP 8-91C25-SM-TG: Task 081-835-3000). Washington, DC: Author.
- Suddarth, D. S. (Ed.). (1991). Lippincott manual of nursing practice (5th ed.). Philadelphia: J. B. Lippincott.

### **3.06: Set Up Buck's Unilateral Leg Traction (66H, 91B, 91C)**

#### **Introduction:**

This task summary describes a field expedient method of setting up Buck's unilateral leg traction. Buck's traction is used as a temporary measure in adults for controlling muscle spasm and pain and for treating hip fracture prior to surgery.

Buck's traction is a type of running skin traction. The pull of the traction is exerted in one plane, with a light force pulling on tape or a special device that is in contact with the skin. The pulling force is transmitted to the musculoskeletal structures to provide immobility, support, and comfort until definitive treatment can be accomplished.

#### **Task Summary:**

##### **Conditions**

You are in a field MTF and have been asked to set up Buck's traction on a patient's right leg. You explained the procedure to the patient and washed your hands. You have the following equipment and supplies: Soft padding; 36" x 2" strip of moleskin with adhesive on one side; a 4-inch elastic bandage; 36" piece of traction cord; approximately 3"x3"x3/4" board; 1 roll of adhesive tape; 18" strip of stockinette; an IV pole for a hospital bed; 1 mannequin with lower extremities; 1 hospital bed.

##### **Standards**

Use a field expedient method to set up Buck's traction on the patient's leg in a safe and effective manner IAW the references.

##### **Performance Measures**

**Go      No Go**

1. Elevate the foot of the bed for countertraction.

— —

**Note.** This can be done with the adjustable DEPMEDS bed commonly used on the wards. It will help prevent the patient from sliding down toward the foot of the bed.

2. Assess the neurovascular status of the extremity. Check for paralysis, pain, abnormal sensations such as burning or tingling, pulse, and color.
3. Assess the skin of the extremity. Check for bruises, abrasions, or other abnormalities.
4. Question the patient to check for a history of circulatory problems or skin allergies.
5. Wash and dry the skin of the extremity as necessary.

— —

— —

— —

— —

Performance Measures	Go	No Go
<b>Note.</b> Clean, dry skin will help with traction tape adherence.		
6. Position the patient in the center of the bed in good alignment for an effective line of pull.	—	—
7. Pad bony prominences of the lower leg.	—	—
8. Apply a continuous strip of moleskin (traction tape) to medial and lateral aspects of extremity as follows:		
a. Use a minimum of 30" moleskin for the average-size adult male, starting the strips of moleskin just below the knee.	—	—
b. Extend moleskin 2-3" past end of foot to allow for attachment of wooden block.	—	—
c. Avoid pressure over the malleoli by padding this area before applying the moleskin, and avoid pressure over the head of the fibula by applying the moleskin below this area.	—	—
9. Wrap the elastic bandage snugly over the moleskin to prevent slippage of the moleskin as follows:		
a. Start at the ankle, wrap the bandage up to the tibial tubercle.	—	—
b. Use spiral-reverse or modified figure-eight turns for wrapping the bandage, and secure with adhesive tape.	—	—
10. Attach the wooden spreader block to the distal end of the tape as follows:		
a. Secure wooden block below foot inside moleskin. (Block should not touch foot.)	—	—
b. Secure traction cord to wooden block. A hole can be drilled through the wooden block for the cord or the cord can be tied around the block.	—	—
<b>Note.</b> The wooden spreader block prevents pressure along the side of the foot. If the spreader block is too narrow, it can cause pressure sores on the ankle. If the spreader block is too wide, it pulls the traction tape away from the heel.		
11. Stabilize traction as follows:		
a. Attach IV pole to foot of bed.	—	—
b. Make sure IV pole is well-secured (e.g., use strong tape--such as "1,000 mile an hour tape"--to secure each arm of the IV pole to the bed).	—	—
c. String traction cord over IV pole.	—	—

Performance Measures	Go	No Go
d. Place small strip of tape on IV pole on either side of traction cord to keep cord in position.	—	—
12. Attach weight as follows:		
a. Create prescribed amount of weight using a sand-filled stockinette or sand-filled MRE bag.	—	—
b. Tape top of weight closed and make a hole in the top end for traction cord.	—	—
c. Secure traction cord to weight.	—	—
<b>Note.</b> The amount of weight is prescribed by a physician. A 5-7 pound weight is commonly used.		
13. Check the traction setup as follows:		
a. Check that the weight is hanging free of the bed and does not touch the floor; that the traction cord is running securely from the spreader block to the weight and is unobstructed; and that the knots are tied securely.	—	—
b. Check elevation of foot of bed for appropriate countertraction.	—	—
c. Assess patient's alignment with the traction, making sure that affected leg is immobilized in a straight plane with line of traction.	—	—
d. Make sure that patient's heel is supported off the bed.	—	—
14. Assess the neurovascular status and skin of the affected leg every 2 to 4 hours.	—	—
15. Assess the patient's psychosocial response to being in traction and respond as needed.	—	—
16. Document relevant information--including the procedure, amount of weight applied, and nursing assessments.	—	—
<b>OVERALL EVALUATION</b>	—	—

**Written Exercises:**

1. What is the purpose of Buck's traction?

2. Buck's is what type of traction?
3. How much weight is normally prescribed for Buck's traction?
4. Describe what you would check to make sure that Buck's traction has been set up in a safe and effective manner.
5. Describe how to apply countertraction as needed for Buck's traction in a field MTF.
6. Describe how to assess the neurovascular and skin status of the extremity. Why is it important to assess this prior to setting up Buck's traction?

#### References

- HQDA. (1992). Soldier's manual and trainer's guide: MOS 91H orthopedic specialist, skill levels 1/2/3/4 (STP 8-91H14-SM-TG: Task 081-834-0003). Washington, DC: Author.
- Kozier, B., Erb, G., Blais, K., Johnson, J. Y., & Temple, J. S. (1993). Techniques in clinical nursing (4th ed.). Redwood City, CA: Addison-Wesley.
- Suddarth, D. S. (Ed.). (1991). Lippincott manual of nursing practice (5th ed.). Philadelphia: J. B. Lippincott.
- Zimmer. (1991). Zimmer traction handbook: A complete reference guide to the basics of traction (6th ed.).

### **3.07: Manage Peritoneal Dialysis (66H)**

#### **Introduction:**

This task summary describes a field expedient method of managing peritoneal dialysis. This skill would be used when it is necessary to initiate peritoneal dialysis while a patient is waiting for aeromedical evacuation.

Dialysis refers to the diffusion of solute molecules through a semipermeable membrane, passing from the side of higher concentration to lower concentration. In peritoneal dialysis, the peritoneum acts as a dialyzing membrane, and dialysate is delivered into the peritoneal cavity. Peritoneal dialysis is used to assist in (a) removing toxic substances and metabolic wastes, (b) establishing electrolyte balance, and (c) regulating the body's fluid balance during renal failure.

#### **Task Summary:**

##### **Conditions**

A physician has ordered peritoneal dialysis for a patient and is preparing to insert a catheter for the dialysis. You must manage the dialysis. You have explained the procedure to the patient and have washed your hands. You have the following equipment and supplies: 1 or 2 liter IV bag of any solution with the label "peritoneal dialysate" on the bag; 1 IV connecting tubing set; simulation of a peritoneal catheter (e.g., you can position the opening of an empty IV bag on a full-body mannequin to simulate the catheter); 1 IV pole; 1 pair of sterile gloves; 1 mask; 1 sterile gown; 1 mannequin; 1 hospital bed.

##### **Standards**

Manage peritoneal dialysis IAW the references.

##### **Performance Measures**

**Go      No Go**

1. Prepare the patient for the procedure as follows:
  - a. Ask the patient to empty his bladder.
  - b. Obtain baseline vital signs and weight (if scale available).
  - c. Assist patient to supine position, with area around umbilicus exposed.
  - d. Provide a mask for the patient.
2. Prepare the solution and tubing as follows:
  - a. Put on sterile gloves and mask.

Performance Measures	Go	No Go
b. Check label on solution and the solution itself.	—	—
c. Add any prescribed medications.	—	—
d. Warm dialysate to body temperature.	—	—
e. Spike the solution container.	—	—
f. Prime the tubing.	—	—
3. Assist the physician with peritoneal catheter insertion as follows:		
a. Use strict aseptic technique during catheter insertion--to include glove, gown, and mask.	—	—
b. Have the patient wear a mask.	—	—
c. Connect the catheter connector to the administration set, which has been previously connected to the container of dialysis solution.	—	—
4. Infuse the peritoneal dialysate as follows:		
a. Open clamp so that dialysate can flow into the peritoneal cavity.	—	—
b. After the fluid has infused, clamp the tubing.	—	—
c. Leave fluid in the cavity for the prescribed time period.	—	—
5. Ensure the patient's comfort and safety as follows:		
a. Monitor patient's vital signs every 15 minutes for the first exchange and hourly thereafter.	—	—
b. Make the patient as comfortable as possible. If the patient experiences pain during the infusion, slow the infusion rate.	—	—
c. Check the dressing at the catheter site. It should remain dry during dialysis.	—	—
<b>Note.</b> Leaking around the catheter site predisposes the patient to infection at the exit site and to peritonitis.		
6. Remove the fluid as follows:		
a. Lower the empty dialysate bag below the level of the peritoneum.	—	—
b. Unclamp the tubing to permit the fluid to drain into the bag by gravity.	—	—

<b>Performance Measures</b>	<b>Go</b>	<b>No Go</b>
c. If the fluid does not drain freely, assist the patient to move from side to side and/or raise the head of the bed.	—	—
d. Drain the amount of fluid specified by the order.	—	—
e. Depending on the physician's order, continue by infusing another bag of peritoneal dialysate or by clamping off the peritoneal catheter.	—	—
<b>Note.</b> When performing bag exchanges, use strict aseptic technique and inspect the bag and tubing for defects and/or leaks.		
7. Assess the outflow fluid as follows:		
a. Assess the appearance of the outflow fluid.	—	—
b. Measure the amount of solution infused and the amount of outflow fluid.	—	—
<b>Note.</b> The outflow fluid usually is straw-colored. Cloudy appearance, blood, and/or fibrin in the outflow fluid may be early signs of peritonitis.		
8. Calculate the fluid balance as follows:		
a. Compare the amount of outflow fluid with the amount of solution infused for each exchange.	—	—
b. Calculate the cumulative fluid balance.	—	—
c. Report large discrepancies between inflow and outflow fluid.	—	—
9. Document relevant information, including the following:		
a. Date and time of procedure and number of exchanges.	—	—
b. Dialysate and additives used and amount of time fluid remains in abdomen for each exchange.	—	—
c. Color of outflow dialysate return from patient.	—	—
d. Cumulative fluid balance.	—	—
e. Appearance of exit site and dressing.	—	—
f. Patient's weight before and after the set of exchanges (if scale available).	—	—
g. Assessment of vital signs and patient's condition.	—	—

<b>Performance Measures</b>	Go	No Go
10. Continue to monitor patient post-treatment for signs and symptoms of peritonitis, including cloudy peritoneal fluid, abdominal pain or tenderness, malaise, fever, and nausea or vomiting.	—	—
<b>Note.</b> An infection is more likely to become evident after dialysis has been discontinued.		
<b>OVERALL EVALUATION</b>		

**Written Exercises:**

1. Discuss one scenario in which peritoneal dialysis would be used for patients in a field environment.
  
  
  
  
  
  
2. What patient information should you document while managing peritoneal dialysis?
  
  
  
  
  
  
3. Describe the signs and symptoms of peritonitis.

**References**

- Kozier, B., Erb, G., Blais, K., Johnson, J. Y., & Temple, J. S. (1993). Techniques in clinical nursing (4th ed.). Redwood City, CA: Addison-Wesley.
- Suddarth, D. S. (Ed.). (1991). Lippincott manual of nursing practice (5th ed.). Philadelphia: J. B. Lippincott.

## CHAPTER 3

### TASK SUMMARIES FOR BATTLE-FOCUSED FUNCTIONS

#### Introduction

##### Battle-Focused Functions

In this chapter, task summaries are presented for battle-focused functions (BFFs). Some task summaries describe very broad-based BFFs; other task summaries describe BFFs that refer to more specific actions performed by nursing personnel in different field environments. A brief overview of BFFs and the use of BFF task summaries in training are presented in this introduction. Trainers should refer to Chapter 1 for more information regarding the use of these task summaries in implementing the Readiness Training Program (RTP) in their unit.

The BFF task summaries are designed to help trainers meet the second goal of the RTP. This goal is to develop the proficiencies of nursing personnel in BFFs, which are defined as actions performed by nursing personnel in support of patient care or unit management in a field environment. The performance of BFFs requires that nursing personnel understand systems with which they must interface in the field and healthcare principles which they must apply to patient care in a field environment. Five categories of BFFs have been developed. These categories are defined as follows:

- **Command and Control Functions:** Actions which require nursing personnel to interface with the command and control system when providing patient care in a field environment. The command and control system is a system designed for "the exercise of command that is the process through which the activities of military forces are directed, coordinated, and controlled to accomplish the mission. This process encompasses the personnel, equipment, communications, facilities, and procedures necessary to gather and analyze information, to plan for what is to be done, and to supervise the execution of operations" (FM 8-10-3, p. Glossary-8). Command and control BFFs include:
  - 4.01: Interface with the Combat Health Support System
  - 4.02: Apply the Law of War to Field Medical Operations
- **Medical Evacuation Functions:** Actions which require nursing personnel to interface with the medical evacuation system when providing patient care in a field environment. The medical evacuation system is a modern, complex transportation system designed to provide "the timely, efficient movement and en route care by medical personnel of the wounded, injured, or ill persons from the battlefield and other locations to MTFs. . . . Evacuation begins when medical personnel receive the injured or ill soldier and continues as far rearward as the patient's medical condition warrants or the military situation requires" (FM 8-10-6, p. 1-2). Medical evacuation BFFs include:
  - 5.01: Interface with the Medical Evacuation System
  - 5.02: Prepare Patients for Evacuation by the Aeromedical Evacuation System

- **Medical Supply Functions:** Actions which require nursing personnel to interface with the medical supply system when providing patient care in a field environment. The medical supply system is that aspect of the combat health logistics system dealing with the procurement, distribution, and storage of medical matériel, including medical-peculiar repair parts (Class VIII supplies) (FM 8-10). Medical supply BFFs include:
  - 6.01: Interface with the Combat Health Logistics System
  - 6.02: Request Field Medical Equipment and Supplies
  - 6.03: Ensure Proper Ward Stock Rotation and Management of Controlled Substances
- **Infection Control Functions:** Actions performed to prevent and control infections associated with (a) battle injuries and (b) disease and nonbattle injuries (DNBI) in a field environment. These actions require nursing personnel to apply infection control principles to the practice of nursing in a field environment for the purpose of minimizing infection and its associated disability, morbidity, and mortality. Infection control BFFs include:
  - 7.01: Apply Infection Control Guidelines to Patient Care
  - 7.02: Apply Principles of Asepsis to Sterile Procedures
  - 7.03: Use Proper Disease Prevention and Surveillance Procedures
  - 7.04: Manage Field Waste
- **Sustainment Functions:** Actions performed in support of patients, oneself, or other staff to ensure ongoing patient care services in a field environment, to include patient care in aid stations, medical companies, dispensaries, clinics, and hospitals in all levels of care. These actions require nursing personnel to apply sustainment principles to their work in a field environment. Sustainment BFFs include:
  - 8.01: Ensure Adequate Nutrition is Provided for Patients and Staff
  - 8.02: Manage Battle Fatigue
  - 8.03: Develop Staffing Plans for Routine Medical Operations
  - 8.04: Develop Staffing and Patient Flow Plans For a Mass Casualty Situation

#### Task Summaries

The format used for task summaries in the Military Qualification Standards (MQS) Manuals has been adapted for use with the BFFs. A difference in format between task summaries for clinical skills and BFFs is necessary because BFFs cannot be demonstrated by actual performance of the function in many training environments. In these environments, nursing personnel must use realistic field scenarios to describe the BFFs as they would perform them in actual patient care situations.

The task summaries for BFFs consist of a task title, conditions, standards, enabling learning objectives, and references. Note that the training objectives for BFFs can be found within the task summaries. A training objective consists of the task title, conditions, and standards at the beginning of a task summary. For the BFF task summaries, the training objective is also the terminal learning objective (TLO), which is defined as the performance required of the student

to demonstrate proficiency in the material being taught. Each BFF task summary includes one or more enabling learning objectives (ELOs). Each ELO consists of an action, conditions, and standards and must be learned or accomplished to learn or accomplish the TLO (TRADOC Reg 350-70).

General definitions of major components of task summaries can be found in the Glossary (see Appendix E). Note that the difference between task summaries for BFFs and task summaries for clinical skills is that BFF summaries have enabling learning objectives instead of performance measures. Brief explanations of BFF task summary components are as follows:

- **Task Title**. Task under consideration.
- **Conditions**. Circumstances under which a task is performed and/or described.
- **Standards**. How well or at what level a task must be performed and/or described.
- **Training Objective**. A statement that describes the desired outcome of a training activity in the unit. It consists of the following three parts: Task title, conditions, and standards.
- **Enabling Learning Objective (ELO)**. An action that must be performed and/or described to accomplish or learn the training objective. An ELO includes the conditions, standards, and description of the action.
  - **Action**. Specific activity that is a part of the task under consideration.
  - **Conditions**. Circumstances under which the action is performed and/or described.
  - **Standards**. How well or at what level the action must be performed and/or described.
  - **Description**. Information needed to perform and/or describe the action to the identified standard.
- **Notes**. Explanatory information supporting task performance.
- **Warnings**. Possible personnel injury or equipment damage.
- **References**. Sources that provide more detailed information about the task.

As previously discussed, trainers should individualize training based on the current mission of their unit and needs of their nursing personnel. This chapter contains task summaries for a wide range of BFFs. Trainers may decide to use one or more of the following task summaries as they are written, revise some summaries to meet their unit's needs, and/or develop new summaries for other clinical skills.

It must be emphasized that the task summaries are not intended to replace the trainers. Instead, the task summaries are designed to serve as guides for subject matter experts who are conducting the training. Trainers must develop their own patient care scenarios to use with the task

summaries, and they should use the listed references as needed for further information regarding the tasks.

#### Training Methods

Training methods are the procedures or processes used to attain the training objectives (TRADOC Reg 350-70). Army training publications can be consulted for guidance regarding use of various training methods (e.g., see FM 25-100 and FM 25-101). Following is one method that can be used to train BFFs:

- Trainers develop scenarios to use with a task summary for a BFF that has been selected for training. Trainers base their scenarios on the general description of the required scenario given in the conditions statement for each "Action" in the task summary. Trainers make their scenarios realistic situations that the personnel being trained are likely to encounter in a field environment.
- Each student is given his own study guide, which contains the task summary for the BFF that is to be trained.
- A trainer who is a subject matter expert in the task being trained presents practical explanatory information about the task to the group of students and allows time for discussion of the BFF being trained.
- Students break into small groups to practice describing and/or performing the task as it would be performed in the given scenario. Each small group is made up of one trainer and three to five students.
- Each student should have the opportunity to describe and/or perform the task for the given scenario until the trainer has determined he can perform the task to standard.
- All students come back together in the large group. In this group trainers discuss the small group activities with the students and answer any final questions regarding performance of the task. Then the cycle can begin again with a new BFF or another aspect of the same BFF being explained to the large group of students.

This training method is particularly advantageous when a unit has a small core group of one or more experienced "senior" trainers who are excellent subject matter experts and several other less-experienced "junior" trainers. The senior trainers can oversee the presentation of material in the large group and can be available to assist junior trainers in their small groups as needed.

#### Training Resources

Trainers must individualize training to meet their unit's needs by developing their own scenarios to use with the task summaries. Use of scenarios that personnel are likely to encounter

in a deployed or field status will make the unit's training realistic and challenging. Resources for the development of scenarios include the *Treatment Briefs* in the 1994 draft of the *DEPMEDS Administrative Procedures and Clinical and Support Guidelines*. Contact the Chief Nurse, FORSCOM or the Chief, Department of Nursing Science, AMEDDC&S for further information about obtaining a copy of this document on disk (see Appendix D).

Furthermore, Mission Training Plans (MTPs) include scenarios that can be adapted for use with the BFF task summaries. Army Training and Evaluation Program (ARTEP) Publications include--but are not limited to--MTPs for medical companies as well as the Combat Support Hospital (CSH), Field Hospital (FH), and General Hospital (GH). Contact the ARTEP Section of the Department of Training Development, AMEDDC&S for information about obtaining a copy of one or more MTPs on disk. You can contact the ARTEP Section at COM (210) 221-2672 or DSN 471-2672/1291 or at the following address:

Department of Training Development  
ATTN: MCCS HTU  
CMDT AHS  
1750 Greeley Road  
Fort Sam Houston, TX 78234-6122

**Note.** Both the content and format of the following task summaries have evolved over time as a result of the writing, reviews, and recommendations of expert panel members from the readiness studies and other subject matter experts as well as lessons learned from use of the task summaries with units in the active and reserve components of the AMEDD. As has been recommended, material from selected FMs and other government documents are reproduced here for the convenience of trainers.

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## A. Command and Control Functions

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### 4.01: Interface with the Combat Health Support System

#### Conditions

You are given scenarios in which you are deployed with your unit and are engaged in providing combat health support (CHS) in a theater of operations (TO).

#### Standards

Describe CHS in a TO as it relates to your unit's nursing personnel and patients in the given scenarios IAW the references.

#### Enabling Learning Objectives

#### Action 1

**Conditions.** You are given a scenario in which you are providing patient care in your medical unit/MTF in a deployed status.

**Standards.** Describe the role of your unit in CHS in the TO in the given scenario IAW the references.

#### Description of Action 1.

1. CHS is a multifunctional integrated system that extends from the forward line of own troops (FLOT) to the communications zone (COMMZ) and ends in the continental United States (CONUS).
2. CHS serves as a force multiplier, with the role of the AMEDD being to conserve the fighting strength and return troops to duty as soon as possible.
3. The CHS mission requires that casualties be collected, triaged, treated, evacuated or returned to duty as far forward as possible.

## Action 2

**Conditions.** You are given a scenario in which patients in your medical unit/MTF have various medical conditions.

**Standards.** Describe how care is provided by the modular medical support system for patients in the given scenario IAW the references.

### Description of Action 2.

1. CHS in a TO (Echelons I and II) is provided by a modular medical support system. The goal is standardization of all medical units within the division, corps, and echelons above corps (EAC). This modular system allows for the movement of assets to rapidly tailor, augment, reinforce, or reconstitute CHS units as needed.
2. The system is designed to acquire, receive and triage patients, as well as provide emergency medical treatment and advanced trauma management (ATM) of critically wounded casualties.
3. The modular medical support system is built around six modules organic to the division and non-divisional CHS units. The mission of these modules is to collect, treat, and return to duty (RTD) or evacuate casualties.
4. Following is a brief description of the six modules of the modular medical support system:
  - a. **Combat Medic Module:** The combat medic module consists of one combat medical specialist (91B10) and the prescribed load of medical supplies and equipment. Combat medics are organic to the medical platoons or sections of combat support (CS) and combat service support (CSS) battalions and squads.
  - b. **Ambulance Squad Module:** The ambulance squad module is comprised of four medical specialists (91B10) and two ambulances. The squad provides patient evacuation throughout the division, corps, and COMMZ, and provides en route care. Medical company ambulance squads are employed in the brigade support area (BSA), division support area (DSA), corps support area (CSA) and all areas of the communications zone (COMMZ). Ambulance squads also are organic to the medical platoons of the maneuver battalions along with the treatment squad and combat medic modules. The latter provides the medics for the maneuver companies.
  - c. **Treatment Squad Module:** This squad consists of a primary care physician, a physician assistant (PA), and six medical specialists (91B10). The treatment squad is trained and equipped to render ATM to battlefield casualties. Goals are (a) to treat and return to duty and (b) to stabilize until patients can be evacuated to the next appropriate echelon of care. Normally there are no holding capabilities at the aid station. To maintain contact with the combat maneuver troops, each squad has two emergency treatment vehicles. Each squad can split into two treatment teams.

- d. **Area Support Squad:** This squad is comprised of one dentist trained in ATM, a dental specialist, X-ray specialist, and medical lab specialist. It is organic to medical companies located in the BSA, DSA, CSA, and COMMZ.
- e. **Patient Holding Squad:** This module is comprised of two practical nurses (91Cs) and two medical specialists (91Bs). It has the capacity to hold and provide minimal care for up to 40 RTD patients for a maximum of 72 hours. This squad is organic to medical companies within the BSA, DSA, CSA, and COMMZ. Emerging doctrine includes a nurse (66H) in the holding squad with duties to provide supervision and management of patients who are being held for RTD, are awaiting medical evacuation, or are overflow from the Forward Surgical Team (FST). Expected implementation is 1999-2000.
- f. **Surgical Squad/Detachment:** This squad is comprised of two surgeons, two nurse anesthetists (66Fs), two operating room specialists (91Ds), one medical-surgical nurse (66H), and two practical nurses (91Cs). The mission is to provide early resuscitative surgery for seriously wounded casualties, to save life, and to preserve physical function. Post-surgical patients awaiting evacuation are held by the patient holding squad. Surgical squads are organic to the medical battalions of airborne and air assault divisions. All other surgical modules are called detachments. They are normally employed in the DSA, but may be employed in the BSA during brigade task force operations. It is projected that the Forward Surgical Team (FST) will replace the Surgical Squad/Detachment beginning in FY 97. It is planned that the FST will be a standardized team capable of providing sustained forward resuscitative surgery in support of the division.

**Note.** When a treatment squad, an area support squad, and patient holding squad are collocated, they form an area support section. The area support and patient holding squads are incapable of independent operations.

### Action 3

**Conditions.** You are given a scenario in which there are casualties with various medical conditions requiring treatment in each of the 5 echelons.

**Standards.** Describe the medical support available for the casualties in each echelon under Medical Force 2000 doctrine in the given scenario IAW the references.

#### Description of Action 3.

1. Refer to DA PAM 40-19, Figure 2-1, p. 7, for a graphic representation of echelons of combat health support.
2. Note that echelons of care and levels of care are NOT the same (see Table 1). Levels of care are Army terms that describe the relative geographic location or unit affiliation of medical organizations such as division level or unit level care. Echelons of care were developed as a DOD standardization to describe the type of care provided by a medical organization. For example, Level 1 care (unit) is provided by combat medics who provide first aid and emergency medical treatment (Echelon I) care. At Level 3 (Echelons Above Division - EAD), hospitalization (Echelon 3) care is provided by the Mobile Army Surgical Hospital (MASH) and Combat Support Hospital (CSH). The levels correspond fairly well to the type (echelon) of care available at each level. However, there are some exceptions. For example, an Area Support Medical Company (ASMC) provides Echelon I and II care at Levels 3 and 4 (Corps/COMMZ).
3. The 5 echelons are as follows:
  - a. **Echelon I:** Major emphasis is placed on measures necessary to stabilize patients (maintain airway, stop bleeding, and prevent shock) and prepare the patient for evacuation to the next appropriate echelon of care. Normally, the combat medic is the first trained provider to render care to the casualty. The combat medic is the first individual in the CHS chain who makes medically substantiated decisions based on medical MOS-specific training. The combat medic is supported by first-aid providers (who give self-aid and buddy aid) and by the combat lifesaver. However--strictly speaking--the self aid/buddy aid and combat lifesaver individuals are not trained medical providers and thus do not provide Echelon I care although they are found at the unit level. (Refer to the Glossary for definitions of these terms.) Treatment squads are also found at the battalion aid station (BAS) as needed.
  - b. **Echelon II:** This echelon is the division area. At this echelon, emergency medical treatment is continued; however, it does not go beyond immediate necessities. "Clearing station" is the appropriate NATO term for the place where care is rendered at this echelon (DSA/CSA/COMMZ). The clearing station has limited blood replacement, X-ray, lab, dental, and patient holding capabilities. Note that recent Army parlance has dropped the term "clearing station" in favor of "medical company" or "area support treatment section of the medical

TABLE 1. ARMY THEATER COMBAT HEALTH SUPPORT MATRIX

LEVEL	ECHELON	UNIT	MEDICAL PROVIDER	CAPABILITY
1A Unit Combat Zone	I Self Aid/Buddy Aid First Aid Emergency Med Treatment	Combat Medic Module	All Soldiers Combat Lifesaver Combat Medic	First Aid Advanced First Aid Emergency Medical Treatment
1B Unit Combat Zone	I Advanced Trauma Management (ATM)	Medical Platoon (BAS) Treatment Squads/Teams organic to other combat and selected combat support units.	Primary Care Physician Physician Assistant	Routine Sick Call ATM Ground evacuation
2 Division Combat Zone	II ATM and Initial Resuscitation	Medical Company (Clearing Station)	Primary Care Physician Physician Assistant	Routine sick call ATM/Resuscitation Ground evacuation Patient holding cots
2/3 Division/Corps Combat Zone	II/III Initial resuscitative surgery to save life, limb, or stabilize prior to transporting	Forward Surgical Team	General Surgeon Orthopedic Surgeon Total personnel: 20	2 OR tables PreOp and PostOp Care 8 holding cots 100 % mobile
3 Corps Combat Zone	III Resuscitative surgery. Stabilization for transport. Return to duty (RTD) within evacuation policy.	Combat Support Hospital (CSH). Mobile Army Surgical Hospital (MASH--HUSM/HUSF) Medical Company, Holding.	MASH: General, orthopedic, thoracic surgeons. "Acute care wards". Total Personnel: 133. CSH: All specialty surgeons, internist, psychiatrist. Total Personnel: 604.	Resuscitative surgery and stabilization; all categories of patients (CSH only hospital). MASH: EMT, OR, 30 beds on "acute care wards." CSH: 296 beds; ICU, ICW, MCW, Neuropsychiatric Ward.
4 Echelons Above Corps Communications Zone	IV Definitive Care Convalescent Care Reconditioning/Rehab (RTD) Primary CONUS evac conduit	Field Hospital (FH). General Hospital (GH).	FH: Dermatologist; General, ortho, & oral surgeons. Total Personnel: 448. GH: Neuro & infectious disease specialists. Total Personnel: 778	Hospitalization: All classes. Rehab Services, OT, PT. FH: 504 beds. GH: 476 beds. No organic laundry.
5 CONUS/OCONUS Zone of Interior	V Restorative Care	MEDDACs, MEDCENS, other federal hospitals, civilian hospitals.	All medical and surgical specialties.	All medical and surgical capabilities, specialized treatment centers.

company"--which provides clearing station functions. Area support medical battalions (ASMBs) provide Level I/II care within the corps and echelons above corps (EAC). ASMBs provide a 1-3 day patient holding capacity for 40 patients who may be returned to duty. ASMCs of an ASMB may be found in the division rear providing Level I/II care to corps troops located within the division.

c. **Echelon III:** The first hospital facilities are located here. They are the MASH and CSH. Treatment is resuscitation, initial wound surgery, and post-operative treatment. At the CSH, patients are stabilized for continued evacuation or RTD. Note that the MASH is generally an Echelon III facility, but has the capability to be employed within the division area (Echelon II).

**Note.** A transition will occur with the MASH during the fielding of the FSTs in FY 97. Current plans are that almost all MASHs will be inactivated.

d. **Echelon IV:** Medical facilities are the Field Hospital (FH) and/or General Hospital (GH).

Hospitals are located in the COMMZ and are staffed to provide general and specialized medical-surgical care. At the FH, patients are given rehabilitation and reconditioning services for return to duty or evacuation within the theater evacuation policy. Patients in a GH usually are not expected to return to duty and are placed into the patient evacuation system for return to CONUS.

e. **Echelon V:** Hospital care provided by military, Veterans' Administration (VA), and non-defense medical system hospitals located in CONUS or OCONUS (e.g., Germany, Hawaii).

4. The Medical Force 2000 (MF2K) hospital configuration is part of the AMEDD modernization effort to restructure theater hospitals in support of combat operations in the TO. Facilities presently included in MF2K are four hospitals, a medical company (holding) and six medical-surgical teams. Corps hospitals initially included the MASH and CSH. COMMZ hospitals include the FH and GH. The medical holding company has a 1200 cot convalescent capability. Medical-surgical teams provide specialized medical-surgical augmentation to CZ and COMMZ hospitals.

5. All hospitals (except the MASH) are configured using various combinations of a four module concept. The CSH, FH, and GH are designed using the four modules as follows:

- a. Hospital unit, base (HUB)\*: 236 beds total.
- b. Hospital unit, surgical (HUS): 60 beds total
- c. Hospital unit, medical (HUM): 180 beds total.
- d. Hospital unit, holding (HUH): 280 beds.

\* The HUB of the Field Hospital has one less 12-bed ICU, giving it a total of 224 beds.

#### Action 4

**Conditions.** You are given a scenario in which you have just been assigned to a unit/MTF in a TO.

**Standards.** Describe the command and control elements of your unit/MTF and TO in the given scenario IAW the references.

#### Description of Action 4.

1. Command and control can be defined as "the exercise of command that is the process through which the activities of military forces are directed, coordinated, and controlled to accomplish the mission. This process encompasses the personnel, equipment, communications, facilities, and procedures necessary to gather and analyze information, to plan for what is to be done, and to supervise the execution of operations" (FM 8-10-3, p. Glossary-8).
2. Command and control in the TO is as follows:
  - a. The Theater Army (TA) Commander is responsible to the Unified Commander for stating how assigned US Army forces will be allocated and employed. The TA commander is also responsible for operations in the COMMZ, as well as combat service support for assigned forces.
  - b. The TA Surgeon (usually the MEDCOM commander or senior medical commander in the COMMZ) provides information, recommendations, and professional medical advice to the TA Commander. As the medical staff advisor, he is also responsible for staff planning, coordination, and development of policies for the CHS of TA forces.
  - c. Theater Army Area Command (TAACOM) is responsible for the support mission of supply, maintenance, and personnel services through subordinate units known as area support groups (ASG).
  - d. Theater Army Medical Command, TOE (MEDCOM) is responsible for providing command and control supervision of assigned and attached units in the TA COMMZ.
3. Command and control elements in the HUB of a CSH are used here as an example of how communication flows within the organization. The communication or organizational structure is as follows:
  - a. Hospital Headquarters Section: This section provides internal command and control and management of hospital services, to include surgical, nursing, medical, pastoral, and administrative services. Personnel include the Hospital Commander; Chiefs of Nursing, Surgery, and Medicine; Executive Officer; Chaplain; Command Sergeant Major (CSM), and an Administrative Specialist (NCO).

- b. Hospital Operations Section: This section is responsible for communications both internal and external, security, plans and operations, deployment, and relocation of the hospital. The staff includes a medical operations officer, a field medical assistant, an operations NCO, a nuclear, biological, and chemical (NBC) NCO, an administrative specialist, and appropriate communications personnel.
  - c. Company Headquarters: This section is responsible for company level command, duty rosters, weapons control, and mandatory training. Staffing includes the Company HQ Commander, 1SG, decontamination specialist, administration clerk, and armorer (weapons clerk).
  - d. Other command and control elements include administration, patient administration, nutrition care, and supply and service (logistics).
4. Following are some of the typical Staff Officer functions within the AMEDD. These functions may vary according to the Hospital Commander. Refer to FM 101-5 and STP 8-67 II MQS (Task S1-8310.00-5008) for more detailed information.
- a. S1 (Personnel Officer). Maintains duty roster, handles and processes all personnel actions, supervises data processing functions, and ensures maintenance of unit strength. Also functions as Adjutant General.
  - b. S2 Officer & S3 Officer (Security, Plans, and Operations). Maintains readiness and deployment plans, maintains alert rosters, and conducts training. Usually in smaller units the job of S2 and S3 are combined. The S2 role includes activities of security and intelligence gathering and collecting and reporting weather information.
  - c. S4 Officer (Logistics). Monitors the requisition of supplies and equipment and supervises the maintenance program.

### Action 5

**Conditions.** You are given the following scenario in which medical personnel must defend against a Level I attack: Small arms fire is heard in the area. The perimeter guards report that three to five individuals with small arms and satchels are attempting to infiltrate the hospital defense. Intelligence reports from the operations section indicate that small threat elements are operating in the general area. The hospital is currently supporting tactical operations. The Company Commander has determined the threat as Level I. (See Glossary for definitions of levels of enemy threat.) The attack results in casualties and damage to hospital facilities. (Refer to ARTEP 8-705-MTP, 1991, pp. 5-240 to 5-242 for this and other scenarios for training.)

**Standards.** Describe the role of nursing personnel in continuing medical operations and protecting patients in the given scenario IAW the references.

#### Description of Action 5.

1. The CSH is employed in an area which may require movement. When the tactical situation demands relocating the unit, patients must be moved to other MTFs.
2. Tactical standing operating procedures (TSOPs) for hospital operations provide the tactics, techniques, and procedures for hospital operations. The tactical operations center (TOC) is the command element of the hospital whose function is to assist the commander and key staff to estimate the situation, assess requirements, and react to varying problems such as area defense, NBC operations, mass casualty situations and CHS operations.
3. Annexes to hospital SOPs should have TSOPs to include how hospital defense is planned and executed. This annex describes procedures for security of the hospital in a wartime environment. The annex should address, at a minimum, (1) sustainment operations, (2) defense reaction force, (3) hospital movement, (4) terrain management, and (5) medical unit self-defense as governed by the Law Of Land Warfare.
4. In response to a Level I attack, the CSH commander/leaders direct the response, to include reporting the attack to the Medical Group/Brigade, increasing perimeter defenses as appropriate, and notifying sub-elements when the attack is over.
5. The CSH responds to a level I attack by:
  - a. Sounding prescribed attack alarm to notify all personnel.
  - b. Occupying defensive positions as directed.
  - c. Continuing normal operational mission (with protective mask and small arms within reach as directed).
  - d. Engaging Level I threat with all available fire (only when fired upon) until threat is defeated and driven from the hospital area.
  - e. Replacing key personnel who are injured and treating casualties.

- f. Evacuating all wounded personnel and casualties as required.
  - g. Performing a damage assessment, to include inspecting all communication lines for breaks or tampering.
  - h. Forwarding personnel and equipment status report to hospital command post (CP).
  - i. Collecting killed in action (KIA) and personal effects in a designated location.
  - j. Moving all enemy prisoners of war (EPW) to designated collection area.
6. In considering a solution to the given scenario, consider the following factors:
- a. Can you sustain operations in your MTF with the damage?
  - b. Will patients need to be moved to other facilities?
  - c. Have you planned for perimeter defense to protect patients and yourself?
  - d. Do you know who your support combat arms troops are in the area and how to get them to come to your assistance?
  - e. What impact will casualties have on your facility? Do you have enough staff to care for wounded? Do you have enough supplies?
  - f. Does the tactical situation prevent the use of medevac assets to move patients from your facility?

#### References

HQDA. (1984). Staff organization and operations (FM 101-5). Washington, DC: Author.

HQDA. (1991). Health service support in a theater of operations (FM 8-10). Washington, DC: Author.

HQDA. (1991). Military qualification standards II, medical service corps (67 Only), company grade officers manual (STP 8-67 II MQS). Washington DC: Author.

HQDA. (1991). Mission training plan for the combat support hospital (ARTEP 8-705-MTP). Washington, DC: Author.

HQDA. (1993). Area support battalion: Tactics, techniques, and procedures (FM 8-10-24). Washington, DC: Author.

HQDA. (1994). Employment of the combat support hospital: Tactics, techniques and procedures (FM 8-10-14 ). Washington, DC: Author.

HQDA. (1995). Commander's guide to combat health support (DA PAM 40-19). Washington, DC: Author.

HQDA. (1995). Division medical operations center: Tactics, techniques, and procedures (FM 8-10-3, final draft). Washington, DC: Author.

## **4.02: Apply the Law of War to Field Medical Operations**

### **Conditions**

You are given scenarios in which you are providing patient care in a field environment and (a) You must provide patient care for enemy wounded and sick; (b) you encounter captured medical supplies and equipment; (c) your medical establishment or unit may be performing actions which are "harmful to the enemy"; and (d) the capture of you and your unit's medical supplies and equipment is imminent.

### **Standards**

Apply the principles of the law of war to medical operations in the given scenarios IAW the references.

## **Enabling Learning Objectives**

### **Action 1**

**Conditions.** Given the references.

**Standards.** Describe the sources of the law of war.

### **Description of Action 1.**

1. Customs are one source of the law of war. Customs are defined as practices which by common consent and long-established uniform adherence have taken on the force of law.
2. Treaties (or conventions) are a second source of the law of war. Examples of treaties are as follows:
  - a. The Hague Conventions, which concern the methods and means of warfare.
  - b. The Geneva Conventions, which are four separate international treaties, signed in 1949:
    - (1) "Geneva Convention for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field" (GWS).
    - (2) "Geneva Convention for the Amelioration of the Condition of Wounded, Sick and Shipwrecked Members of Armed Forces at Sea" (GWS Sea).
    - (3) "Geneva Convention Relative to the Treatment of Prisoners of War" (GPW).
    - (4) "Geneva Convention Relative to the Protection of Civilian Persons in Time of War" (GC).

**Note.** Signatories of the Geneva Conventions are obligated to follow the articles during declared war. The US is a signatory, but not all of our potential adversaries are signatories.

## Action 2

**Conditions.** You are given a scenario in which you must provide patient care for enemy wounded and sick in a field environment.

**Standards.** Describe the patient care you would provide in the given scenario IAW the references.

### Description of Action 2.

1. You have an obligation to come to the aid of enemy wounded and sick as their condition requires.
  - a. "Wounded and sick" can be considered the act of falling or laying down of arms because of a wound or sickness. This constitutes a claim to protection.
  - b. Any wounded or sick person is entitled to respect and humane treatment and the care which his condition requires.
2. The wounded shall be treated humanely and cared for without any adverse distinction based on sex, race, nationality, religion, political opinions, or other similar criteria.
  - a. Concessions may be made with respect to food, clothing, and shelter, which take into account the different national habits and backgrounds of the wounded and sick.
  - b. The wounded and sick shall not be made the subjects of biological, scientific, or medical experiments of any kind which are not justified on medical grounds and dictated by a desire to improve their condition.
  - c. The wounded and sick shall not willfully be left without medical assistance, and conditions exposing them to contagion or infection shall not be created.
3. The only reasons which can justify priority in the order of treatment are reasons of medical urgency. This is the only justified exception to the principle of equality of treatment of the wounded.
4. If you must abandon wounded or sick, you have a moral obligation--as far as military considerations permit--to leave medical supplies and personnel to assist in their care. Likewise, care for enemy wounded cannot be refused based on the pretext that his own army has abandoned him without medical personnel and equipment.

### Action 3

**Conditions.** You are given a scenario in which your capture by the enemy is imminent.

**Standards.** Describe the protection and identification of medical personnel in the given scenario IAW the references.

#### Description of Action 3.

1. Article 24 of the GWS provides special protection for "medical personnel exclusively engaged in the search for, or the collection, transport, or treatment of the wounded or sick, or in the prevention of disease, [and] staff exclusively engaged in the administration of medical units and establishments."
  - a. Article 24 personnel are protected from intentional attack if medical personnel are identifiable as such. Identification is facilitated by medical personnel wearing an arm band bearing the Distinctive Emblem (a red cross or red crescent on a white background), or by their employment in a medical unit, establishment, or vehicle that displays the Distinctive Emblem.
  - b. Article 24 personnel are entitled to "retained person" status. They are not deemed to be prisoners of war, but otherwise benefit from the protection of the GPW. They are authorized to carry out medical duties only, and "shall be retained only in so far as the state of health . . . and the number of prisoners of war require."
2. Medical personnel who meet the exclusively engaged criterion of Article 24, GWS, are entitled to wear an arm band bearing the Distinctive Emblem of the red cross and carry the medical personnel identification card authorized in Article 40, GWS (DD Form 1934).
3. Medical personnel may guard their own unit without any concurrent loss of their protected status under Article 24, GWS.

#### Action 4

**Conditions.** You are given a scenario in which your field medical establishment or unit is performing actions which are questioned as being "harmful to the enemy."

**Standards.** Describe those actions which would cause your medical establishment or unit to lose its protected status under the Geneva Conventions in the given scenario IAW the references.

#### Description of Action 4.

1. Medical assets lose their protected status by committing acts "harmful to the enemy," which include acts the purpose or effect of which is to harm the enemy by facilitating or impeding military operations.
  - a. Examples of harmful acts are the use of a hospital as a shelter for able-bodied combatants, as an arms or ammunition dump, or as a military observation post. Another example is the deliberate siting of a medical unit in a position where it would impede an enemy attack.
  - b. The use of smoke and obscurants during medical evacuation operations does not differ from the use of camouflage and does not constitute an act harmful to the enemy.
2. The following conditions are not to be regarded as acts harmful to the enemy:
  - a. Medical personnel may be armed for their own defense or for the protection of the wounded and sick under their charge. However, they must refrain from all aggressive action, and may only employ their weapons if attacked in violation of the Convention.
    - (1) The arms that medical personnel may use are only defensive arms. By Army regulation these are defined as service rifles (M16s) and pistols. Other US services restrict arms to pistols alone.
    - (2) The presence of machine guns, grenade launchers, booby traps, hand grenades, light antitank weapons, or mines in or around a medical unit or establishment would seriously jeopardize its entitlement to privileged status under the GWS. The deliberate arming of a medical unit with such items could constitute an act harmful to the enemy and cause the medical unit to lose its protection, regardless of the location of the medical unit.
  - b. As a rule, a medical unit is to be guarded by its own personnel. However, it will not lose its protected status if the guard is performed by armed soldiers. Both the military guard and the armed medical personnel may use their weapons to ensure the protection of the unit.
  - c. Wounded arriving in a medical unit may still be in possession of small arms and ammunition, which will be taken from them and handed to authorities outside the medical unit. Should a unit

be captured by the enemy before it is able to get rid of these arms, their presence is not of itself cause for denying the protection to be accorded the medical unit.

- d. The presence of personnel and matériel of the veterinary corps with a medical unit is authorized, even where they do not form an integral part of such a unit.
- e. A medical unit or establishment protected by the GWS may take in civilians as well as military wounded and sick without jeopardizing its privileged status.

### Action 5

**Conditions.** You are given scenarios in which your unit has captured medical supplies and equipment and in which the capture of US medical supplies and equipment is imminent.

**Standards.** Describe the proper disposition of medical supplies and equipment in the given scenarios IAW the references.

#### Description of Action 5.

1. Consider the following factors regarding the disposition of captured medical supplies and equipment:
  - a. Representative samples of all captured medical supplies and equipment items must be preserved and reported.
  - b. These medical supplies or matériel shall first be used to treat enemy wounded and sick and only after their needs have been fully met may such supplies be used to treat others.
  - c. If these supplies are unfit for use or not needed, they may be abandoned for enemy use.
  - d. Under no circumstances will captured medical supplies be destroyed.
2. Consider the following factors regarding the imminent capture of US medical supplies and equipment:
  - a. When capture by enemy forces is imminent, medical matériel must not be purposefully destroyed.
  - b. When a commander, because of military necessity, has decided to abandon patients, he is obligated--as far as military considerations permit--to leave sufficient and adequate medical personnel and matériel for the care of these abandoned patients. Under all other conditions, every attempt must be made to evacuate all medical matériel and equipment.

### References

- HQDA. (1956). The law of land warfare (FM 27-10). Washington, DC: Author.
- HQDA. (1985). Instructor's Guide: The law of war (TC 27-10-3). Washington, DC: Author.
- HQDA. (1991). Health service support in a theater of operations (FM 8-10). Washington, DC: Author.
- Vollmar, L. C., Jr. (1992). Development of the laws of war as they pertain to medical units and their personnel. Military Medicine, 157, 231-236.

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## B. Medical Evacuation Functions

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### 5.01: Interface with the Medical Evacuation System

#### Conditions

When providing patient care in a field environment, nursing personnel must be able to interface with the medical evacuation system to ensure that the movement of sick and wounded patients is as rapid and efficient as possible. You are given scenarios in which you must prepare to receive and/or send patients in the medical evacuation system.

#### Standards

Describe (a) considerations in medical evacuation planning, (b) use of theater and intratheater evacuation policies, (c) use of medical regulating procedures, and (d) use of patient regulating forms and the US Field Medical Card in the given scenarios IAW the references.

### Enabling Learning Objectives

#### Action 1

**Conditions.** You are given a scenario in which you must participate in planning for medical evacuation for your level of care in a field environment.

**Standards.** Describe required planning in the given scenario IAW the references.

#### Description of Action 1.

1. Consider that medical evacuation involves the following factors:
  - a. Collecting and triaging the sick and wounded.
  - b. Providing transportation.
  - c. Providing medical care en route.
  - d. Anticipating complications and being ready to perform emergency medical intervention.
2. Consider the following factors which influence the employment of medical evacuation assets:
  - a. Tactical commander's plan for employment of combat forces.

- b. Anticipated patient load, expected areas of patient density, and patient conditions.
- c. Availability of medical evacuation resources.
- d. Availability, location, and type of MTFs.
- e. Security of ground and air routes for evacuation platforms.
- f. Army airspace command and control plan, engineer barrier plans, road network, and weather conditions.

### Action 2

**Conditions.** You are given a scenario that involves use of theater and intratheater evacuation policies.

**Standards.** Describe the application of theater and intratheater evacuation policies in the given scenario IAW the references.

#### Description of Action 2.

1. Theater evacuation policy establishes, in number of days, the maximum period of noneffectiveness (hospitalization and convalescence) that patients may be held within the theater for treatment. Time is calculated for a single, uninterrupted episode of illness or injury, including transit time.
  - a. Theater evacuation policy is formally established by the Secretary of Defense, with the advice of the Joint Chiefs of Staff, and upon the recommendation of the theater commander. In practice, the theater evacuation policy essentially is determined by the Commander in Chief (CINC) for that theater.
  - b. A patient is evacuated as soon as possible after the determination is made that he cannot be returned to duty within the number of days established by the theater evacuation policy.
2. Subordinate commands may establish intratheater patient evacuation policies within the limits of the theater patient evacuation policy and subject to approval by the theater commander.
  - a. Intratheater patient evacuation policies must be flexible and changed as dictated by the tactical situation.
  - b. Intratheater evacuation policies may differ among hospitals depending on their location, facilities, staff, and the numbers and types of patients received.
  - c. Patient length of stay is determined by the patient's condition, expected patient load, and availability of transportation resources.

### Action 3

**Conditions.** You are given a scenario in which you must participate in planning to evacuate patients for specialized medical treatment.

**Standards.** Describe proper medical regulating procedures, including responsibilities of key personnel, in the given scenario IAW the references.

#### Description of Action 3.

1. Medical regulating is the coordination and control of moving patients to MTFs that are best able to provide the required specialty care. Medical regulating entails the following factors:
  - a. Identifying patients awaiting evacuation and their special care needs.
  - b. Locating available beds that meet the identified special care needs.
  - c. Coordinating the transportation means for movement, including requirements for en route care and equipment.
2. Careful control of patient evacuation to appropriate hospitals is necessary to:
  - a. Effect an even distribution of cases.
  - b. Ensure adequate beds are available for current and anticipated needs.
  - c. Route patients requiring specialized treatment to the appropriate MTF.
3. Factors which influence the scheduling of patient movement include the following:
  - a. Patient's medical condition.
  - b. Tactical scenario.
  - c. Availability of evacuation means.
  - d. Locations of MTFs with special capabilities or resources.
  - e. Current bed status of MTFs.
  - f. Surgical backlogs.
  - g. Number and location of patients by diagnostic category.
  - h. Location of airfields, seaports, and other transportation hubs.
  - i. Communications capabilities to include radio silence procedures.
4. Responsibilities for medical evacuation differ according to the given evacuation scenario for a level of care. Consider that -
  - a. The patient administrator (PAD) accomplishes the medical regulating function at the hospital level. His medical regulating functions include the following:(1) Consolidating all evacuation requests within the hospital and forwarding an evacuation request to his next higher headquarters for action.

- (2) Keeping his next higher medical regulating officer (MRO) apprised of current beds available and operating room status.
- b. The MRO functions as the responsible individual at command and control headquarters for receiving and consolidating evacuation requests. The MRO also maintains the current patient status, bed status, and the surgical backlog at subordinate hospitals.

#### Action 4

**Conditions.** You are given a scenario in which (a) authorization has been given to evacuate patients and (b) DD Forms 600, 601, and 602 must be completed by the originating medical facility (OMF).

**Standards.** Describe use of the patient regulating forms in the scenario IAW the references.

#### Description of Action 4.

- 1. The Patient's Baggage Tag (DD Form 600) is prepared for each piece of baggage accompanying patients traveling by military common carrier.
  - a. The OMF completes DD Form 600.
  - b. The patient's stub from DD Form 600 is detached and given to the patient or the senior medical attendant as the receipt for checked baggage.
  - c. DD Form 600 and accompanying stub may be destroyed when baggage is returned to the patient or the form is replaced by a local baggage tag and stub at the destination hospital.
- 2. The Patient Evacuation Manifest (DD Form 601) is prepared for each patient to be transferred. All patients destined for the same off-load terminal may be listed on the same manifest form.
  - a. The OMF prepares DD Form 601.
  - b. At the loading point, the DD Form 601 is given to the senior medical person present. He will check all patients and baggage listed on the manifest, make any changes, and return a signed copy acknowledging receipt for all manifested patients and baggage.
  - c. The OMF retains the signed copy of the DD Form 601 for 12 months, after which it may be destroyed.

3. The Patient Evacuation Tag (DD Form 602) is the patient's en route medical record. The attending physician prescribes en route medical care requirements on this form before the patient departs the OMF, and all en route treatments are noted on the form during the patient's journey.
  - a. The OMF enters all pertinent information on DD Form 602. If a battle casualty does not have a DD Form 1380 (US Field Medical Card) attached when picked up, the air ambulance aidman will initiate a DD Form 602 and attach it to the patient.
  - b. While in the aeromedical evacuation system, personnel providing en route medical care use the reverse side of the form to note patient examinations and treatments in cases where such information is not sufficient to justify opening the patient's clinical record. Treatments administered at en route medical facilities or aeromedical staging facilities (ASFs) are also annotated on the form.
  - c. The destination hospital staples the basic tag of DD Form 602 to the Standard Form 602 in the patient's health record. The "Embarkation Tab" and "Debarkation Tab" may be retained by the Air Evacuation Squadron or disposed of locally.

**Note.** USAF Air Evacuation Squadrons provide USAF evacuation. TRANSCOM is responsible for world wide evacuation and this mission is executed by Air Mobility Command. The USAF is normally responsible for "tactical" evacuation from Level 3 to 4 within a TO and "strategic" evacuation from Level 4 to 5. Under current doctrine, the component commands (i.e., Army, Marine, and Navy) are responsible for "tactical" evacuation from Level 1 to 2 and from Level 2 to 3 and within Level 3 (corps). Emerging doctrine will have the Army request USAF assistance for fixed wing evacuation of patients from Level 2 to 3 under those situations where evacuation distances exceed the capability of the Army's rotary wing air ambulances.

#### Action 5

**Conditions.** You are given a scenario in which a patient is receiving care in the field and en route to a MTF.

**Standards.** Describe use of the US Field Medical Card (DD Form 1380) in the given scenario IAW the references.

#### Description of Action 5.

1. DD Form 1380, the US Field Medical Card (FMC), is used to record data similar to that recorded by the inpatient treatment record cover sheet (ITRCS). It is made so that it can be attached to the casualty. The FMC is used as follows:

- a. By BASs, clearing stations and nonfixed troop or health clinics working overseas, on maneuvers, or attached to commands moving between stations.
  - b. By an MTF to record an outpatient visit when the health record is not readily available.
  - c. In the TO during times of hostilities.
  - d. To record "Carded for Record Only" (CRO) cases.
2. An MTF officer completes the FMC as fully as possible or supervises its completion. However, the combat medic first attending the casualty may initiate a FMC.
  - a. The combat medic records the name, SSN, and grade of the patient. He describes the medical care or treatment given, enters as much information as time permits and initials the signature block. If a tourniquet has been applied to a patient, it must be noted on the FMC.
  - b. If a patient is being transferred from the field to a MTF, the FMC must be attached to the patient's clothing.
  - c. The supervising AMEDD officer then completes, reviews, and signs the FMC.
3. Disposition of Field Medical Cards is as follows:
  - a. The original FMC of CRO cases or of an admission with a disposition other than to a hospital is sent to higher headquarters within the command for coding.
  - b. When a patient is admitted to a hospital, his FMC is used to prepare his inpatient treatment record (ITR). This FMC then becomes part of his ITR.
  - c. The original of an FMC used to record outpatient treatment is filed in the patient's health record or outpatient treatment record.

#### References

- HQDA. (1991). Health service support in a theater of operations (FM 8-10). Washington, DC: Author.
- HQDA. (1991). Medical evacuation in a theater of operations: Tactics, techniques, and procedures (FM 8-10-6). Washington, DC: Author.

## **5.02: Prepare Patients for Evacuation by the Aeromedical Evacuation System**

### **Conditions**

You are given scenarios in which you are providing patient care in your field unit/MTF and must prepare patients for evacuation by the Aeromedical Evacuation System. You are given the originating and receiving units and/or MTFs and a list of patients to be evacuated with their medical conditions.

### **Standards**

Describe the (a) classification and movement precedence of the patients, (b) provisions that must be made for the patients' equipment, supplies, medications, and diets, (c) the required decision to transport, patient stabilization, and documentation, and (d) special preparations required due to the patients' medical conditions in the given scenarios IAW the references.

### **Enabling Learning Objectives**

#### **Action 1**

**Conditions.** You are given a scenario in which you are preparing patients with various medical conditions for aeromedical evacuation.

**Standards.** Describe the classification and movement precedence for each patient in the given scenario IAW the references.

#### **Description of Action 1.**

##### **1. General assumptions and guidelines:**

- a. The following general policies are based in part upon the premise contained in the Joint Services Directive AFR 164-5, AR 40-535, OPNAVINST 4630.9C, MCO P4630.9A, which requires the originating medical facility (OMF) to provide supplies and equipment necessary for patient treatment during the aeromedical evacuation flight.

**Note.** Doctrine is currently being revised to explain the appropriate use of patient movement items. More specifically, a process is being developed to provide the OMF with "Patient Evacuation Contingency Kits" (PECKs) so that equipment organic to the OMF will not be depleted. These revisions will necessitate changes in the listed references.

- b. The following Aeromedical Evacuation patient classifications and movement precedences are used during normal peacetime operations. The terminology will be used to support aeromedical evacuation during conflict and other contingencies but the context will change. The biggest change will be in time requirements associated with movement procedure.

**2. Classification of Patients:** Patient classification is determined by the OMF physician. Patients are classified in the following manner: (Reference: AFR 164-5, AR 40-535, OPNAVINST 4630.9C, MCO P4630.9A).

a. **Class 1 - Neuropsychiatric Patients**

- (1) **Class 1A - Severe Psychiatric Litter Patients.** Psychiatric patients requiring the use of a restraining apparatus, sedation, and close supervision at all times.
- (2) **Class 1B - Psychiatric Litter Patients of Intermediate Severity.** Psychiatric patients requiring tranquilizing medication or sedation, not normally requiring the use of a restraining apparatus, but who can react badly to air travel or who may commit acts that could endanger themselves or the safety of the aircraft. Restraining apparatus should be available for use.
- (3) **Class 1C - Psychiatric Walking Patients of Moderate Severity.** Psychiatric patients who are cooperative and who have proved reliable under observation.

b. **Class 2 - Litter Patients (Other Than Psychiatric)**

- (1) **Class 2A - Immobile Litter Patients.** Patients unable to move about on their own volition under any circumstances.
- (2) **Class 2B - Mobile Litter Patients.** Patients able to move about on their own volition in an emergency.

c. **Class 3 - Walking Patients (Other Than Psychiatric).** Walking patients, other than psychiatric, who require medical treatment, care, assistance, or observation en route.

d. **Class 4 - Troop Class.** Walking patients, other than psychiatric, who require no medical treatment during flight, are physically and emotionally able to travel unattended, and do not require observation or custodial care (military patients who do not require hospitalization or active medical supervision will be returned to CONUS through regular administrative channels by the most expeditious means in accordance with service regulations).

**3. Movement Precedence:** The movement precedence will determine how quickly the patient will be picked up and moved by the Aeromedical Evacuation system. It is determined by the OMF physician. Precedence categories are as follows: (Reference: AFR 164-5, AR 40-535, OPNAVINST 4630.9C, MCO P4630.9A).

a. **Urgent** - Patients categorized as "urgent" require emergency movement to save life or limb or prevent serious complications. Aircraft will be launched or diverted to pick up and deliver the patient to the destination as soon as possible. NOTE: Psychiatric or terminally ill patients are not considered "urgent" patients.

- b. **Priority** - Patients categorized as "priority" require prompt medical care not available locally. Patients will be picked up within 24 hours and delivered with the least possible delay. NOTE: Patients may be subject to several en route stops.
- c. **Routine** - Patients will be picked up within 72 hours and moved on routine or scheduled flights. Because of the routing of the Aeromedical Evacuation system, patients may be required to fly for more than one day and remain overnight in an Aeromedical Staging Facility (ASF) or holding ward.

### Action 2

**Conditions.** You are given a scenario in which you are preparing patients with various medical conditions for aeromedical evacuation.

**Standards.** Describe the types and amount of equipment, supplies, medications, and special diets required to support each patient during aeromedical evacuation in the given scenario IAW the references.

#### Description of Action 2.

1. A 7/15 day theater evacuation policy is used in developing the DEPMEDS Aeromedical Evacuation requirements database: If patients cannot be returned to duty within 7 days at 3rd Echelon (3E) and 15 days at 4th Echelon (4E), then they should be evacuated as soon as patient stability and evacuation resources permit. Some DEPMEDS patients may be evacuated directly to CONUS and this is not reflected in calculating the DEPMEDS Aeromedical Evacuation matériel requirements.
2. The Aeromedical Evacuation System will provide the following on each fixed-wing aircraft mission:
  - a. Equipment - 1 cardiac monitor/defibrillator, 1 pulse oximeter, 1 oxygen analyzer, 3-4 suction apparatus (oropharyngeal), 1 multi-patient intermittent suction attachment (a new development since Operation Desert Storm). Emergency supplies including: 2 tracheostomy tubes, chest tube insertion kit, laryngoscope and ET tubes, oral airways, AMBU, first line cardiac drugs (bicarbonate, epinephrine, lidocaine and bretylium.).
  - b. Routine medical supplies including IV sets, Foley catheters, NG tubes and reinforcement dressings. Additionally, Aeromedical Evacuation Crews will provide most controlled medications (e.g., morphine and meperidine) required for all patients.
3. The OMF will provide three types of matériel to accompany Aeromedical Evacuation patients: Medical equipment, other reusable items, and consumable supplies. There are special considerations for each type of matériel in what is provided and how the OMFs are re-supplied.

- a. Medical Equipment: The OMF will provide "Critical Aeromedical Evacuation Compatible Special Equipment" (ventilator, cardiac monitor, and pulse oximeter) in excess of equipment provided by the Aeromedical Evacuation Crew Kits on the aircraft.
  - (1) "Aeromedical Evacuation compatible special equipment" is defined as equipment that has passed specific testing and is certified for use on-board aircraft, "make" & "model" specific. Note: Few equipment items in older DEPMEDS hospitals have this certification.
  - (2) Specific DEPMEDS medical matériel sets (MMSs) will be developed to provide support for aeromedical evacuation patients. The plan is to provide designated OMFs with "Patient Evacuation Contingency Kits" (PECKs) so they do not have to use their own organic supplies. The contents of these MMSs are still being debated. Possible MMSs are (a) tactical aeromedical evacuation equipment support MMSs (ventilator, cardiac monitor, suction apparatus, pulse oximeter, and equipment support kits (support kits = supplies that are unique to each piece of equipment)) and (b) strategic aeromedical evacuation equipment support MMSs (ventilator, cardiac monitor, and equipment support kits). Each MTF would have starter sets in quantities consistent with the hospital size and mission. Additional replacement quantities (float stocks) of the critical aeromedical evacuation compatible special equipment would be located at theater aeromedical evacuation equipment pools. These theater equipment pools would be established by the theater CINC when evacuation policies are implemented.
- b. Other Reusable Items: The OMF will provide additional items that are reusable (returnable) (e.g. skeletal immobilizing frames, litters, litter straps, litter mattress pad, restraint sets, blankets, and linens) with Aeromedical Evacuation patients.
  - (1) The requirements for the reusable items are added into the DEPMEDS hospital supply sets in quantities to support the days of supply as determined by each Service.
  - (2) After arrival at the Destination Medical Treatment Facility (D-MTF), these items will be collected and returned to the Single Integrated Medical Logistics Manager (SIMLM) for redistribution in the theater.
  - (3) Resupply of these reusable items will be through the established Class VIII medical resupply system and SIMLM on a free issue basis. In CONUS, the assumption is that all MTFs will return these items for reuse using the Defense Logistics Agency Depot System.
  - (4) Other reusable items are not anticipated to be processed to the theater pools & CONUS collection points, since this could delay the quick return of the "Critical Aeromedical Evacuation Compatible Special Equipment" (ventilator, cardiac monitor, suction apparatus, and pulse oximeter). It is anticipated that adequate quantities of the "Other Reusable Items" are available and special return procedures are not needed.

- c. Consumable Supplies: The following assumptions were applied to calculate the consumable supply requirements: The OMF will provide a one-day supply of medication and consumable supplies (e.g., IVs, dressings) to accompany the patient moving from Echelon 3 to Echelon 4. A three-day supply of medications and consumable supplies is required for a patient moving from Echelon 4 to CONUS. Also, any patient going directly to CONUS without being admitted to a 4th Echelon hospital should have three days supply.
  - (1) The requirements for extra medication and consumable supplies are added into the DEPMEDS hospital supply sets in quantities to support the days of supply as determined by each Service.
  - (2) Resupply of these items will be through the established Class VIII medical resupply system and the SIMLM system.
- d. Special Diets: The OMF will provide all special patient diets (which include dental soft, liquid and tube feedings) in the following quantities: Echelon 3 to 4 = one meal; Echelon 4 to CONUS = two meals.

### Action 3

**Conditions.** You are given a scenario in which you are preparing patients with various medical conditions for aeromedical evacuation.

**Standards.** Describe the required decision to transport, patient stabilization, and documentation in the given scenario IAW the references.

#### Description of Action 3.

1. Decision to Transport: The requirement to transport a patient on Aeromedical Evacuation aircraft is initiated by the originating attending medical officer, who is responsible for the patient's clinical welfare, the stability of the patient, and the urgency of evacuation in consideration of the current theater evacuation policy. In conjunction with the Theater Medical Regulating Officer (T-MRO), the decision is made of who, when, how, and where patients will be evacuated.
2. Patient Stabilization: Patients will be stabilized within the limitations of the OMF's capability. It is understood that patients moved from Echelon 1 or 2 to Echelon 3 may not be clinically stable due to the patient's condition and the limited medical resources and time available. Prior to moving patients, an airway must be ensured, fractures splinted, hemorrhage controlled and treatment of shock initiated. Patients being moved from Echelon 3 to 4 should be stable enough to tolerate a 12-hour bed-to-bed move. Patients being moved from Echelon 4 to CONUS should be stable enough to

tolerate a 24-hour bed-to-bed move. A stabilized patient is one who, in the best clinical judgment of the OMF physician, can withstand a bed-to-bed evacuation of 12-24 hours duration.

3. Documentation:

- a. DD Form 602, Patient Evacuation Tag, should accompany the patient to ensure appropriate care during transport. This document is primarily used to direct and record en route care. The DD Form 602 should include primary and all other significant diagnoses; correct classification; proper precedence; and orders for all en route medication, care and special diet, if necessary. Concise, pertinent nursing notes are documented on the back of the form.
- b. SF Form 502, Medical Record - Narrative Summary, should be completed by the OMF physician. The narrative summary should be concise, clear and list all the significant recent and past medical facts. This may be the only clinical information the medical personnel have time to review to make en route decisions during transport.
- c. Pertinent laboratory, x-ray, medical, and dental records needed for continuing care should accompany the patient.

**Action 4**

**Conditions.** You are given a scenario in which you are preparing patients with various medical conditions for aeromedical evacuation. The patients' medical conditions require general considerations for aeromedical evacuation; infusion therapy, respiratory, cardiovascular, neurological, gastrointestinal, genitourinary, orthopedic, EENT, thermal, and psychiatric and substance abuse considerations; and special considerations related to dressing changes, diabetic patients, and patients with fevers.

**Standards.** Describe special preparations for evacuation that are required due to the patients' medical conditions in the given scenario IAW the references.

**Description of Action 4.**

1. General Considerations:

- a. Patients should meet the following standards for aeromedical evacuation:
  - (1) Stable vital signs,
  - (2) Stable cardiopulmonary status,
  - (3) Stable hemoglobin (10 grams) or hematocrit (30%),
  - (4) No active bleeding,
  - (5) Adequate fluid and hydration status, and

- (6) Other requirements stated under specific patient considerations (e.g., head, chest, abdominal).
- b. Patients will be transported by the aeromedical evacuation system with their medical records, valuables, personal effects and medical matériel items as follows:
  - (1) From Echelon 3 to Echelon 4, a one day supply of medications, special diets and consumable supplies.
  - (2) From Echelon 4 to Echelon 5, a three day supply of medications, special diets and consumable supplies.
  - (3) Litter patients should have a litter, litter mattress pad, 2 litter straps, 2 blankets (wool or aluminized), a pillow and linens.
  - (4) One blanket (wool or aluminized) should also be provided with each ambulatory patient.  
[Note: If possible, ambulatory patients should wear boots or shoes, since hospital slippers will not work well in cold, wet climates and on board aircraft with sharp objects, heating inconsistencies, etc.]
  - (5) While in the theater, patients should also be transported with their Chemical Warfare gear.
- c. Normally, patients who need aeromedical evacuation are entered into the aeromedical evacuation system from mobile aeromedical staging facilities (MASFs), which are usually located near forward airstrips, for in-theater tactical flights and from aeromedical staging facilities (ASFs), which are located near fixed medical facilities, for strategic flights to CONUS.

## 2. Infusion Therapy Considerations:

- a. Intravenous Therapy Patients -
  - (1) Peripheral IV sites will be changed within 48 hours prior to transport and will be patent with no signs of infiltration.
  - (2) The IV tubing should have a micro-drip chamber to ensure a more accurate flow rate.
  - (3) Patients with a "keep open" IV line for IV medication administration will have the site converted to a heparin lock system.
  - (4) Vented glass IV bottles can be accepted for transport although plastic IV bags are preferred for safety reasons.
  - (5) OMF will provide IV solutions and IV medications with a secondary IV tubing set. Aeromedical Evacuation will provide items needed for a heparin flush.
- b. Blood Transfusion Patients -
  - (1) Because of the decreased partial pressure of oxygen at operational cabin pressure altitudes, patients should be transfused until hct is at least 30%. These patients should have no active bleeding.
  - (2) Post-transfusion hgb/hct will be accomplished prior to transport and should meet minimum levels: Hemoglobin 10 gm or hematocrit 30% or SaO<sub>2</sub> 90% (on room air using pulse oximetry). Platelets should be at least 25,000.

- (3) Class III and IV hemorrhage patients receiving blood within three days prior to transport will require a cardiac monitor. Patients who are not receiving oxygen in the MTF will require prn oxygen based on the following estimates: 30% of Class III and 40% of Class IV.
  - (4) Units of blood will be accepted for patients likely to need transfusions during transport. No blood warming capability or adequate refrigeration for blood storage is normally available on the aircraft.
  - (5) OMF will provide blood units, blood shipping box (freshly iced), administration set and normal saline solution.
- c. Total Parenteral Nutrition (TPN) Patients -
- (1) TPN will not be accomplished ordinarily during medical evacuation.
  - (2) For patients already receiving TPN, the OMF physician should consider changing TPN patients to D<sub>10</sub>W with electrolytes for the duration of both tactical and strategic medical evacuation.
  - (3) If changed to D<sub>10</sub>W, the OMF physician should document on the DD Form 602 the lab studies required for en route overnight stays and the required D<sub>10</sub>W rate and blood glucose testing during transport.
  - (4) If changed to D10W, the OMF will provide a 12-24 hour supply of pre-mixed D10W solution and appropriate supplies. Additional D10W and electrolyte concentrate bolus will be provided for en route mixing during 4E to CONUS transport.

### 3. Respiratory Considerations:

- a. Oxygen Therapy -
- (1) Oxygen administration requirements are based upon 60% cannulas and 40% mask use.
  - (2) Patients requiring continuous oxygen should have a pulse oximetry monitored minimum SaO<sub>2</sub> greater than 90%. Results should be documented in the patient medical record and the DD Form 602.
  - (3) Patients who are not receiving oxygen in the MTF will require prn oxygen based on the following estimates: 30% of Class III and 40% of Class IV.
  - (4) Patients receiving continuous oxygen will have frequent pulse oximeter monitoring during transport.
  - (5) OMF will provide the oxygen cannula/mask and humidification bottle filled with sterile water.
- b. Tracheostomy Patients -
- (1) A tracheostomy will be performed when extended assisted ventilation is anticipated or in patients transported to 5E (CONUS) with upper airway injuries that are less than 3 days old.
  - (2) The tracheostomy stoma will have large suture on each side of the incision site to facilitate replacement of the tracheostomy tube in case of displacement.

- (3) The tracheostomy tube should be changed to the type with an inner cleaning cannula prior to transport. An appropriate sized trach trochar must be affixed to the top of the patient's gown for immediate access in the event an emergency reinsertion is required.
- (4) Balloon cuffs should be filled with normal saline instead of air since gas expansion at altitude may cause tracheal damage. This will be completed by the OMF prior to transport.
- (5) A tracheostomy collar or T-tube will be attached to the ET or tracheostomy tube during transport to ensure adequate oxygenation and humidification and to reduce plugging.
- (6) Tracheostomy suction sets will be reusable for prn suctioning provided the catheter is properly protected. The suction set will be replaced every 6 hours.
- (7) The OMF will provide tracheostomy tube trochar, trach collar or tracheostomy tube with tubing, humidification bottle filled with sterile water, and a suction catheter kit.
- (8) Aeromedical evacuation will provide a #8 and #10 tracheostomy tube for emergency replacement, trach care cleaning sets, and supplemental suction catheter kits, supplemental suction catheters, sterile gloves, and sterile water.

c. Ventilator Patients -

- (1) Barometric pressure changes and decreased P<sub>O</sub><sub>2</sub> will impact both equipment and patients and may necessitate repeated ventilator adjustments during in-flight transport.
- (2) Ventilator patients will be accompanied by a qualified medical attendant or respiratory therapist. Critically ill patients require continuous pulse oximetry and cardiac monitoring.
- (3) Patients will have an NG tube and may require intermittent suction for gastric decompression.
- (4) The OMF should document on DD Form 602 the ventilator control settings for a beginning reference point during transport.
- (5) The OMF will provide the ventilator with tubing and a humidification bottle filled with sterile water (including sterile water for the humidifier), cardiac monitor, pulse oximeter, soft restraints, and a qualified medical attendant. When a TXP™ ventilator is used, the OMF will provide a 1000 ml bag of sterile water and tubing for the humidifier.
- (6) The OMF will request immediate replacement of equipment and personnel from the theater pools.

d. Chest Tube Patients -

- (1) Patients with a pneumothorax (any degree) are at increased risk at altitude because of gas expansion. These patients must have a chest tube with a Heimlich valve (one-way flutter valve) in place before air transport.
- (2) All chest tubes must be connected to a Heimlich valve and taped in place to prevent dislodgement. An aeromedical evacuation-approved plastic chest drainage unit will be used during transport. Glass bottles are not acceptable. If a chest drainage system is not available, the Heimlich valve can be attached to either a glove or drainage bag prior to transport.
- (3) Continuous suction is not available during transport. However, the drainage set could be connected to suction for brief periods to facilitate chest tube drainage.

- (4) Patients with recently removed chest tubes will not be transported until the following conditions are met:
  - (a) A minimum of 48 to 72 hours after chest-tube removal has passed.
  - (b) An expiratory or lordotic chest x-ray within 24 hours prior to transport demonstrates that the lungs are fully expanded. The results of the x-ray will be in the patient's medical records.
  - (c) An occlusive dressing is securely applied to the site where the chest tube was removed.
- (5) The OMF will provide a Heimlich valve and an aeromedical evacuation-approved chest drainage set.
- (6) Aeromedical evacuation will provide an extra Heimlich valve and a chest drainage set for emergency replacement during flight.

e. Lower Respiratory/Allergy Patients -

- (1) Patients with a history of allergy or asthma should be transported with a bronchodilator medihaler.
- (2) The OMF will provide medihaler, respiratory medications and hand-held nebulizer for respiratory treatment when applicable.
- (3) Aeromedical evacuation will provide extra nebulizer for replacement use.

4. Cardiovascular Considerations:

a. Cardiac Patients -

- (1) These patients should be thoroughly evaluated before a flight and necessary supplemental oxygen and medications ordered because of in-flight hypoxia.
- (2) Patients who have suffered a myocardial infarction within the last ten days and who are not free of complications for five days should not be transported. If such patients must be transported, continuous oxygen and cardiac monitoring will be required as well as a qualified medical attendant.
- (3) The OMF will provide the oxygen cannula/mask, humidification bottle filled with sterile water, and an aeromedical evacuation-approved cardiac monitor with a full roll of EKG paper and an extra set of electrodes.

b. Anticoagulant Therapy Patients -

- (1) Patients receiving continuous IV heparin administration will have the IV heparin discontinued and administered subcutaneously during transport.
- (2) All patients on IV or oral anticoagulant therapy will have current repeat blood work done within 12 hours of transport, will be documented on DD Form 602, and will be within the following limits:
  - (a) Heparin - PTT within 1.5 - 2 times the control
  - (b) Coumadin - PT within 1.5 - 2 times the control

- c. Vascular Injury Patients: Arterial vascular repairs will be stabilized by either cast or external fixator devices. Casts must have a large window over the surgical site or be bivalved to allow emergency access to the area.

## 5. Neurological Considerations:

### a. Seizure Disorder Patients -

- (1) Altitude changes (gas expansion hypoxia), noise, vibration and optic stimulation can precipitate seizures in this type patient.
- (2) Patients should be seizure free for 2 days prior to transport.
- (3) Patients should have adequate pharmacological seizure control prior to transport. They will also have a heparin lock in place for emergency IV anti-convulsant administration use.
- (4) The OMF will provide an IV heparin lock site, and the IV anti-convulsant will be documented on DD Form 602.
- (5) Aeromedical evacuation will provide IV anti-convulsant (diazepam) for emergency use.

### b. Head Injury Patients -

- (1) Severe head injury patients will usually be transported to CONUS as soon as practical post-injury due to their prognosis.
- (2) Patients who have had an invasive cranial procedure (e.g. encephalogram) or cranial surgery will not be transported until a minimum of 2 days have elapsed to prevent trapped air expansion, unless a CT scan is available and reveals the cranium is free of trapped air. CT scan findings will be documented in patients' medical records and DD Form 602.
- (3) Cerebral swelling must be sufficiently stabilized to the level that intravenous corticosteroids (e.g. Decadron) are not required during transport. Intraventricular monitoring capability is not available during transport.
- (4) Comatose patients will have bilateral eye patches with ointment, Foley catheter, and NG tube connected to straight drainage or intermittent suction if gastrointestinal function is significantly diminished.
- (5) These patients are susceptible to G-forces and should be in a semi-Fowler's position during takeoff and landing to enhance cranial venous outflow.

### c. Spinal Column/Cord Injury Patients -

- (1) Paraplegics, quadriplegics and patients with cervical, thoracic or lumbar fractures will be transported on the skeletal immobilizing frame. These patients will usually be transported to CONUS within 7 days post-injury due to their prognosis.
- (2) Cervical fracture patients may have a Halo fixation device. This immobilization device will be in place for a minimum of 3 days. Depending on the diagnosis, the patient can be transported on a litter or ambulatory.
- (3) The skeletal immobilizing frame and accessories will remain with the patient to the final D-MTF.

- (4) A Collins<sup>TM</sup> traction device may be used for cervical traction if Halo fixation is not available. The OMF physician will apply a Collins traction device prior to transport. No swinging weights will be accepted.
- (5) The OMF will provide a skeletal immobilizing frame with base cart, 3 litter straps, armrests, footboard, stabilizer bars (or two additional litter straps), 2 pillows, and linen set, as well as an extra litter with 2 litter straps to secure skeletal immobilizing frame's anterior frame, accessories, and supplies during transport. The OMF will also provide a Collins<sup>TM</sup> traction device when applicable and apply it to the patient prior to transport.

## 6. Gastrointestinal Considerations:

### a. Abdominal Surgical Patients -

- (1) Premature transport of casualties shortly after abdominal surgery carries a high morbidity rate. Expansion of trapped gas at altitude can cause severe pain, vomiting and possible dehiscence.
- (2) Patients should have adequate bowel functions and be complication free prior to transport to reduce evolved or trapped gas expansion problems.
- (3) Patients with minimal bowel function will require an NG tube connected to intermittent suction for gastric decompression.

### b. Nasogastric (NG) Tube Patients -

- (1) A patient with abdominal wounds, abscesses or obstructions; severe head injuries; quadriplegia or paraplegia; or on a ventilator will require an NG tube.
- (2) The capability exists for a multi-patient hookup that will allow up to three casualties to be suctioned intermittently using a single suction machine during transport. If intermittent suction is not needed the NG tube will be connected to gravity drainage bag.
- (3) If intermittent suction is not available and the tactical situation is such that these patients must be moved, these patients will require a cabin altitude restriction of 5000 ft. Additionally, frequent manual aspiration of the NG tube will be required during flight to maintain gastric decompression.
- (4) OMF will provide an irrigation set and antacid medications.
- (5) Aeromedical evacuation will provide supplemental NG tubes, extra irrigation sets, 60 ml syringes, and potable water for irrigation set.

### c. Ostomy Patients -

- (1) Ostomy patients will be transported with an ostomy bag in place. Ostomy bags that are not pre-vented must be manually vented. The bag must be emptied prior to transport due to increased bowel mobility and gas expansion during transport.
- (2) OMF will apply a new ostomy drainage bag which can be emptied from the bottom prior to transport (for example 6515-00-415-4143.)
- (3) Aeromedical evacuation will provide replacement ostomy bags.

- d. **Gastric Feeding Tube Patients -**
- (1) Comatose, quadriplegic and severe head injury patients will have their tube feedings discontinued at least 2 hours before transport to minimize possible vomiting and the risk of aspiration. The OMF will start hydrating IV therapy prior to transport. Patients' tube feedings will be resumed if remaining overnight at an ASF.
  - (2) Other patients with tube feeding will have formula diluted with water (1:1 ratio) to minimize nausea and vomiting.
  - (3) The OMF will provide a tube feeding bag, a 24-hour supply of dietary supplement, an irrigation set, and a liter of sterile water for mixing and containerizing the feeding.

7. Genitourinary Considerations:

- a. **Urinary Catheter Patients -**
- (1) Do not remove catheters from patients immediately prior to transport if urinary retention or incontinency is a problem.
  - (2) If urinary retention or incontinence is a problem, the patient should be catherized prior to transport.
  - (3) Urinary drainage bags should be emptied prior to transport.
  - (4) Aeromedical evacuation will provide a supplemental Foley catheter set for replacement or initiation.
- b. **Renal Failure and Dialysis Patients -**
- (1) Renal patients usually have multi-systems involvement and must be evaluated carefully before transport.
  - (2) Lab work (hemoglobin, hematocrit, blood urea nitrogen, creatinine and electrolytes) will be accomplished within 12 hours prior to transport.
  - (3) Every effort will be made to transport the patient midpoint between dialysis cycles.
  - (4) An IV heparin lock site is required for transport.
  - (5) All access ports, fistulas, shunts, and their locations and special instructions pertaining to their care will be documented on DD Form 602.
  - (6) Continuous oxygen administration and frequent pulse oximetry will be required for renal failure dialysis patients with low hemoglobin/hematocrit levels.

8. Orthopedic Considerations:

- a. **Casts/Splint Patients -**
- (1) Fractures must be securely splinted or immobilized with casts or external fixators before transport. Pneumatic splints are not acceptable because of altitude, changing pressure and volume within the splint.
  - (2) Ideally, casts on recent fractures/injuries/surgical sites should be at least 48 hours old and bivalved. A bivalved cast allows for swelling of soft tissue and permits rapid emergency access to secondary hemorrhage, especially if the injury is less than 48 hours old.
  - (3) Replacement casts should be at least 12 hours old and dry prior to transport.

- (4) The OMF should document the following information on the cast with a permanent marker and on DD Form 602: Date and type of injury, date of surgery and cast application, simple sketch of bone injury, and any vascular repair performed.

b. Extremity Traction Patients -

- (1) Free swinging weights for traction are not acceptable for transport. Collins™ traction, NATO traction, or heavy rubber tubing tied to the litter frame will be used during transport.
- (2) OMF will apply self-contained traction (Collins™, NATO, or heavy rubber tubing) to the litter prior to transport.

9. EENT Considerations:

a. Ear and Sinus Patients -

- (1) The ear and sinus cavities are especially susceptible to barotrauma due to trapped air in such small cavities. Patients with recent upper respiratory infections should be screened carefully.
- (2) Ear congested patients should be able to clear their ears by using the Valsalva maneuver.
- (3) Aeromedical evacuation will provide nasal decongestant spray and Politzer Bag to manage ear block problems during transport.
- (4) A myringotomy should be considered for patients unable to clear their eustachian tubes by normal methods.

b. Maxillofacial Injury Patients -

- (1) Any dental work should be completed at least 48 hours prior to transport.
- (2) Any nasal packing should be removed before transport.
- (3) Patients prone to motion sickness should be premedicated with an antiemetic.
- (4) Cerebrospinal drainage may increase at altitude. These patients usually should be receiving at least two antibiotics prior to transport.
- (5) Patients with immobilized upper and lower jaws must have a quick-release device applied or have wire cutters or scissors in their possession. The OMF will provide wire cutters or scissors and document on DD Form 602 that the patient knows how to use his wire cutter, scissors, or quick-release device. The OMF will also provide a special diet.

c. Eye Injury/Disease Patients -

- (1) The eye is susceptible to oxygen deficiency and/or increased barometric pressure.
- (2) Retinal detachment patients usually do not require altitude restrictions, but they should be placed on supplemental oxygen.
- (3) Patients with recent penetrating eye injury or surgery are susceptible to retained intraocular air. The OMF ophthalmologist or physician will validate that the eye is free of trapped air prior to transport. The results of the examination will be documented in the patient's medical records and on DD Form 602.

**10. Thermal Considerations:**

**a. General -**

- (1) Severe burn patients should have an experienced burn team or qualified medical attendant(s) and will be transported on a litter or skeletal immobilizing frame. The skeletal immobilizing frame is preferred for bed-to-bed transports greater than 8 hours to facilitate repositioning the patient. The following should be accomplished prior to transport: An airway secured; NG tube and Foley catheter inserted; IV in place; patient hydrated and medicated. These patients should be considered for "urgent" movement.
- (2) Escharotomies need to be performed on all full thickness circumferential burns. Patients with full thickness burns of greater than 10% should be evacuated promptly from the forward area and to CONUS within 2-5 days post-burn.
- (3) Burns will be protected with sterile, dry dressings during transport. Dressings will be reinforced, not changed, during flight. Disposable sheets will not be used with burn patients. The OMF will provide additional dressings for excessively draining burns. Aeromedical evacuation will provide routine dressings for reinforcement during transport.

**b. Cold Injuries -**

- (1) Large vesicles or bullae should be protected and kept intact if possible.
- (2) Protective dry dressings are desirable during transportation, and sterile cotton should be used between involved fingers and toes to prevent maceration.

**c. Phosphorus Injuries -**

- (1) All phosphorus casualties will be debrided of phosphorus particles prior to evacuation. If there is a question of retained phosphorus particles, the wound must be sealed from any air contact.
- (2) The dressing will be identified and labeled "PHOSPHORUS DRESSING".
- (3) Where bed-to-bed transfer will require more than 12 hours, the involved areas should be covered by a liberal application of topical antimicrobial agent to prevent microbial proliferation.

**11. Psychiatric and Substance Abuse Considerations:**

**a. Psychiatric Patients -**

- (1) Acutely ill psychiatric patients (Class 1A) who require close supervision will have leather wrist and ankle restraints as well as preflight sedation and will be dressed in hospital clothing and be on a litter.
- (2) Moderately ill psychiatric patients (Class 1B) will require preflight sedation, will be dressed in hospital clothing, and will have a litter and a set of restraints available for use during transportation.
- (3) Ambulatory psychiatric patients (Class 1C) are considered cooperative when they have proven their reliability under observation. They will be dressed in hospital clothing.

- (4) The OMF will remove from Class 1A & 1B patients items that may be harmful to the patient and others (e.g., razor blades, pocket knives, matches, personal medication.)
  - (5) The OMF will provide leather restraints for Class 1A & 1B patients and an appropriate key to unlock them.
  - (6) Aeromedical evacuation will provide two extra restraint sets for emergency use during transport.
- b. Drug/Alcohol Abuse Patients: Patients should undergo adequate (3-5 days) detoxification before they are transported.

12. Dressing Changes:

- a. Patient dressings will be reinforced, not changed, during transport to avoid exposure of secretions/drainage to the medical crew and to avoid exposing an open wound to the aircraft environment.
- b. The OMF will provide additional dressings for excessively draining wounds and/or unique-type dressings.
- c. Aeromedical evacuation will provide routine dressings for reinforcing.

13. Diabetic Patients:

- a. Patient should be stable and regulated on appropriate insulin.
- b. On the day of transport, the morning blood glucose will be within the 80-300 mg/dl range and will have appropriate insulin coverage, and the patient's response will be documented in the medical records and on DD Form 602.
- c. Aeromedical evacuation will provide Chemstrips to determine blood glucose levels during transport.

14. Patients with Fevers:

- a. Patients who require a cooling blanket should be off the blanket at least 24 hours and managed effectively with antipyretics before they will be accepted for transport.
- b. Patients who have recurrent or persistent fevers greater than 101°F may be accepted for transport provided the following conditions are met:
  - (1) An adequate fever work-up has been done to rule out active sepsis.
  - (2) Responsive to antipyretic therapy.
  - (3) On an appropriate antibiotic for at least 24 hours prior to transport.

- c. Aeromedical Evacuation crews should be advised of any patient with a possible communicable disease and appropriate protective measures instituted on the patient prior to transport.
- d. Patients who have respiratory signs and symptoms (e.g., fever, productive cough, hemoptysis) will wear a mask during transport for protection of the medical personnel. The mask will be changed hourly or more frequently if moist.
- e. The OMF will provide masks.

#### References

Bellamy, R. F., et al. (1991). Surgery guidelines. In R. Zajtchuk, et al. (Eds.), Combat casualty care guidelines (pp. 111-113). Washington, DC: Office of The Surgeon General.

Departments of the Air Force, the Army, and the Navy. (1975). Aeromedical evacuation: Worldwide aeromedical evacuation (AFR 164-5, AR 40-535, OPNAVINST 4630.9C, MCO P4630.9A) Washington, DC: Author.

Departments of the Air Force, the Army, the Navy, and Transportation. (1991). Aeromedical evacuation: A guide for health care providers (AFP 164-4, TB MED 289, NAVMED P5115, COMDTINST M6320.20). Washington, DC: Author. (Change 1 to 1986 publication).

DMSB. (1994). DEPMEDS administrative procedures and clinical and support guidelines (3rd ed. draft). Fort Detrick, MD: Author.

HQDA. (1991). Medical evacuation in a theater of operations: Tactics, techniques, and procedures (FM 8-10-6). Washington, DC: Author.

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### C. Medical Supply Functions

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#### 6.01: Interface with the Combat Health Logistics System

##### Conditions

You are given scenarios in which you must interface with the combat health logistics system to provide patient care in an area of operations (AO) or theater of operations (TO).

##### Standards

Describe requirements for combat health logistics support in the AO/TO and describe the purpose and use of Class VIII supplies in the given scenarios IAW the references.

#### Enabling Learning Objectives

##### Action 1

**Conditions.** You are given a scenario in which your unit is preparing for deployment and you must assist with plans for logistics support.

**Standards.** Describe the general requirements for combat health logistics support in the given scenario IAW the references.

#### Description of Action 1.

1. Combat health logistics support is an important component of the overall combat health support (CHS) system. Logistics planning is required to support combat operations. Combat health logistics planning includes supply Class VIII (medical matériel and medically peculiar repair parts), medical equipment maintenance, optical fabrication, and blood storage and distribution (Class VIIIb). New technologies such as oxygen generation may someday also be included in combat health logistics planning.
2. Key characteristics of good logistics planning include the following:
  - a. Planning must be done in advance.
  - b. Planning must be continuous and plans should be reviewed often and updated as necessary.

- c. Maintenance planning must be conducted concurrently with supply planning to ensure that equipment and supplies are fully mission capable.
- 3. Refer to FM 8-55 (para 2-5) for general characteristics of a good CHS plan. These characteristics should be applied to logistics planning.

### Action 2

**Conditions.** You are given a scenario in which you must understand the special characteristics of Class VIII supplies.

**Standards.** Describe the special characteristics of Class VIII Supplies in the given scenario IAW the references.

#### Description of Action 2.

- 1. Class VIII supplies consist of medical matériel, including medical-peculiar repair parts and equipment. Class VIII supplies fall under the direction of the Army Surgeon General. In the AO/TO the component surgeon/Joint Task Force Surgeon directs CHS.
- 2. Following are subclasses of the Class VIII system:

VIII-1	Controlled substances
VIII-2	Tax-free alcohol
VIII-3	Precious metals
VIII-4	Nonexpendable medical items, not restricted
VIII-5	Expendable medical items, not restricted
VIII-6	All drugs and related items Federal Supply Classification
VIII-6505	Not otherwise restricted
VIII-7/9	Commander designated controlled items
VIII-0	US Army Medical Matériel Agency controlled sensitive items

- 3. Following are special characteristics of the Class VIII system that set it apart from the other classes of supply:
  - a. Medical supplies are given "protected status" under provisions of the Geneva Conventions. It is necessary to store, protect, and distribute medical supplies separately from other supplies to retain their special status. The Tactical Commander decides whether special status is to be evoked.
  - b. The system must be capable of adapting to patient load and maintaining efficiency in operations in a wide variety of environmental conditions.

- c. The highly technical nature of medical supplies and equipment and extensive regulation by the federal government requires that medical matériel be specially handled and environmentally controlled by personnel who are knowledgeable about the rules and regulations. Such management includes controlled substances.
- d. Medical equipment must be mission capable (fully operational), with priority given to life sustaining equipment. This support must be provided as far forward as possible.

### Action 3

**Conditions.** You are given a scenario in which you are to plan for storage, transportation and accountability of Class VIII supplies for your unit/MTF in an AO/TO.

**Standards.** Describe special considerations for the storage, transportation, and accountability of Class VIII supplies in the given scenario IAW the references.

#### Description of Action 3.

1. Class VIII supplies generally require covered storage. Considerations must be given to (a) environmental conditions of the MTF, such as desert climates, mountains, jungle, or Arctic conditions, (b) shelf life, (c) climate control, such as refrigeration of some drugs/supplies, and (d) special security/accountability (e.g., controlled substances).
2. Preservation and packing procedures should be maintained IAW TB MED 1.
3. Knowledge of overall space requirements of the MTF is important. Detailed space requirements should be based on the following factors:
  - a. Specific assignment of support missions.
  - b. Supply levels to be carried.
  - c. Area and number of troops to be served.
  - d. Types of supplies needed for mission requirements.
4. Efficient use of storage space includes protection of supplies from deterioration due to environmental conditions, such as fire, heat, cold, wind, water, theft, and covert enemy actions.
5. Transportation of Class VIII supplies includes the following:
  - a. Proper methods should be utilized to minimize unnecessary shipments, trans-shipment, and rehandling of medical supplies. For example, proper documentation should be used and special considerations should be made regarding the shipment of hazardous materials.

- b. Movement of supplies through successive supply installations can cause delays, risk of damage, misrouting, and loss.
  - c. The availability of transportation assets for Class VIII supplies should be analyzed. Some Class VIII items require special transportation and/or storage, including items that need flammable or security precautions (e.g., controlled substances), climate control (e.g., refrigeration for some drugs/supplies), and considerations for short shelf life.
6. The Division Medical Supply Office (DMSO) is responsible for Class VIII supplies in the Division. The Medical Logistics Battalion (Med Log Bn) provides support to corps and EAC medical units. The Med Log Bn also provides supply to the division through the DMSO. Blood distribution platoons provide Class VIIIb forward to the DMSO and to corps/EAC units.

#### Action 4

**Conditions.** You are given a scenario in which your unit is deploying and you must assist with the load plan for class VIII supplies necessary to support initial operations.

**Standards.** Describe a load plan for class VIII supplies necessary to support initial operations in the given scenario IAW the references.

#### Description of Action 4.

1. In the initial stages of a developing theater, arriving medical units--to include the Medical Logistics Battalions (Med Log Bns)--will operate using their unit basic loads, including necessary Class VIII matériel.
2. To deploy with the necessary Class VIII matériel, the planner must consider the following factors:
  - a. The mission of the unit.
  - b. Contingency plans.
  - c. An estimate of the type and number of units that will be supported by the MTF.
  - d. The name and location of the supplier for Class VIII resupply (e.g., the location of the supplier will influence the appropriate days of supply (DOS)).

### **References**

HQDA. (1991). Health service support in a theater of operations (FM 8-10). Washington, DC: Author.

HQDA. (1994). Planning for health service support (FM 8-55). Washington, DC: Author.

HQDA. (1995). Combat health logistics in a theater of operations: Tactics, techniques, and procedures (FM 8-10-9). Washington, DC: Author.

HQDA. (1995). Medical logistics policies and procedures (AR 40-61). Washington, DC: Author.

## **6.02: Request Field Medical Equipment and Supplies**

### **Conditions**

You are given scenarios in which you must request field medical equipment and supplies on a routine and emergency basis for your unit/MTF in a TO.

### **Standards**

Describe proper procedures for requesting field medical equipment and supplies on a routine and emergency basis in the given scenarios IAW the references.

## **Enabling Learning Objectives**

### **Action 1**

**Conditions.** You are given a scenario in which you must make available the required equipment and supplies for your unit/MTF in a TO.

**Standards.** Describe the actions you must take to obtain the required field medical equipment and supplies and to develop a functional packing plan in the given scenario IAW the references.

### **Description of Action 1.**

1. Following is an example of the procedure for obtaining supplies in a CSH:
  - a. The hospital services logistics officer coordinates with higher HQ (Med Group or Brigade) or supporting Med Log Bn (forward) concerning logistical support.
  - b. The medical NCOIC or wardmaster, in coordination with the head nurse, is responsible for maintaining adequate stockage levels for patient care activities. Stockage levels are dependent on the type of field unit and patient population anticipated, as well as the prescribed basic equipment load lists.
  - c. All medical sections should maintain both consumable and non-expendable medical supplies in accordance with unit assemblage listings (UALs). Nursing personnel should review and update UALs on a regular basis. USAMMA publishes authorized updates in the Supply Bulletin 75 series received by S4 logistics officers within the unit. Supply Bulletins should be reviewed on a regular basis by the Chief Nurse when in garrison and by Section Supervisors when deployed. Requests for updates (additions/deletions) of UAL items can be accomplished via a request from the MTF through the S4 to USAMMA. UALs and the hospital formulary should be updated as needed.

- d. The Commander's budget sometimes restricts actually purchasing medical supplies to be on-hand in garrison. Even so, UALs should be kept up-to-date. When preparing for deployment, a list of critical items should be submitted with the necessary priority designator (PD) to ensure that all items are available for the mission.
  - e. The NCOIC or wardmaster coordinates with the medical supply officer (Health Services Matériel Officer) or medical supply NCOIC for requisitions and resupply. Ordering is based on a system of reordering determined by SOP. The medical NCOIC and supply NCOIC complete an inventory of basic load packing lists and determine the reorder dates and time it will take for resupply.
2. Functional packing is a concept whereby units pack given lists of equipment and supplies that will support mission requirements--e.g., ATLS chests, OR DEPMEDS boxes, etc. Chests are packed to support operations until medical resupply is established. Load packing lists should be reviewed with the NCOIC.

### Action 2

**Conditions.** You are given a scenario in which you must assist with medical resupply for your unit/MTF.

**Standards.** Describe the procedures for medical resupply, including who is responsible for resupply and conditions for resupply in the given scenario IAW the references.

#### Description of Action 2.

- 1. Provision of medical matériel support (medical supplies and equipment, biomedical equipment maintenance, optical fabrication and blood) is an important function of combat health support.
- 2. Movement of supplies in a TO is coordinated by the TA Chief Surgeon, who advises the TA Commander.
- 3. Organizations for medical matériel support in a TO is as follows:
  - a. The Med Log Bn (Rear) is assigned to the Theater MEDCOM. It supplies field hospitals and general hospitals located in Echelons Above Corps (EAC). A secondary mission is to resupply Class VIII on an area basis in EAC and to back up 3 to 5 Med Log Bns (Forward) in the Corps. The Med Log Bn (Rear) provides receipt, storage, shipment, medical maintenance, optical fabrication, and blood management.

- b. The Med Log Bn (Forward) is under the command and control of the Medical Group or Medical Brigade of an Army Corps. Major supported units are divisions, CSHs, and MASHs. Resupply of the Med Log Bn (Rear) or cross-leveling with adjacent Med Log Bns (Forward) should more than one corps be operating in the theater.
- c. All hospitals in the TO under MF2K DEPMEDS design principles normally carry in their basic load 10 days of supply (DOS)--3 DOS in each Medical Matériel Set (MMS) and 7 DOS in the hospital resupply MMS. The divisional battalion aid stations (BASs) in their Trauma Treatment Team or Squad configurations normally carry 2-3 DOS for the Trauma Treatment and Sick Call MEss. The Division Medical Supply Office (DMSO) of the DISCOM (MSB) normally carries the back-up supplies for the division in its 10-15 DOS basic load. Within limitations the DMSO can resupply all divisional assigned or attached units. (Note that the DOS are determined for any given mission. Described here is "normal," but this may vary.)

**Note.** It is projected that the MASH will be replaced by the FST and that there will be no hospital units operating in the division's rear boundary. The CSH will operate in the corps. The FST, when employed in support of a divisional/nondivisional medical company, will receive its resupply from the supporting medical company/DMSO.

### Action 3

**Conditions.** You are given a scenario in which you must resupply combat medics assigned to maneuver battalions in a Battalion Aid Station (BAS).

**Standards.** Describe the backhaul system of medical resupply for combat medics in the given scenario IAW the references.

#### Description of Action 3.

1. Resupply of a forward-deployed BAS in a heavy division is the responsibility of the medical company of a Forward Support Battalion (FSB).
2. The concept of backhaul refers to the process by which supplies are moved forward to combat medics by use of ambulances.
3. Class VIII supplies needed by the combat medic are ordered through the BAS, medical company, or the DMSO. The actual resupply of combat medics is "informal." Usually the medic provides a verbal or written list of his needs, and the ambulance crew supplies him, if possible, from on-board stores. The ambulance crew then resupplies itself when it gets back to the BAS. Ambulances moving between the BAS and forward support medical company gets supplies from the DMSO Class VIII distribution point usually set up within the BSA.

#### Action 4

**Conditions.** You are given a scenario in which you must obtain emergency equipment and supplies for your unit/MTF.

**Standards.** Describe the procedure for procurement of emergency equipment and supplies necessary to save life or limb in the given scenario IAW the references.

#### Description of Action 4.

1. Requests for emergency supplies and equipment are honored whether the request is in written or verbal form.
2. Issues are made on such requests at any time.
3. Preparation of a Request for Issue is the form used to request supplies. Essential elements of Request for Issue include the following:
  - a. National Stock Number (NSN), Management Control Number (MCN), and Commercial and Government Entity Code (CAGE).
  - b. Unit of issue.
  - c. Requested quantity.
  - d. Physician requesting emergency supply item (03 life or death).
4. Appropriate priority designator (PD) must be indicated for the logistics system to discriminate among orders received.
5. The PD is assigned to each request for issue based on the unit's Force/Activity Designator (FAD) and Urgency of Need Designator (UND). A special consideration UND is an 03 for medical or disaster supplies or equipment (life and death priority). This is used to obtain supplies and equipment necessary to prolong life, relieve suffering, or expedite recovery in case of illness or disease, regardless of the assigned FAD.
6. The unit's mass casualty SOP should include procedures for emergency resupply during a mass casualty situations. This may include runners, stand-by supply personnel, or a combination thereof.

### Action 5

**Conditions.** You are given a scenario in which you must obtain blood products for your unit/MTF in a TO.

**Standards.** Describe the procedure for obtaining blood products in the given scenario IAW the references.

#### Description of Action 5.

1. The overall philosophy for blood availability in the TO is to provide blood as far forward as possible.
2. Within the TO, the TA Commander is responsible for the Army blood program.
3. The TA surgeon is responsible for staff supervision of the program.
4. The management and distribution of Class VIIIb (blood and blood products) is a function of the Joint Blood Program Office (JBPO) within the TO.
5. During the buildup period, immediate requirements may be provided by prepositioned blood products. These stocks are designed to meet initial blood requirements until the logistics system can deliver blood into the TO.
6. Liquid and frozen blood products enter the TO via USAF blood trans-shipment centers (BTCs) for further distribution to Army Blood Bank platoons assigned to medical battalions (rear and forward).
7. MASH units operating in divisional support areas are resupplied by their supporting Med Log Bn (Forward). Liquid blood products are also distributed by the supporting Med Log Bn (Forward) and may be issued down to the forward medical companies of the FSBs.

#### References

- HQDA. (1990). Logistics (FM 700-80). Washington, DC: Author.
- HQDA. (1991). Health service support in a theater of operations (FM 8-10). Washington, DC: Author.
- HQDA. (1994). Planning for health service support (FM 8-55). Washington, DC: Author.
- HQDA. (1995). Combat health logistics in a theater of operations: Tactics, techniques, and procedures (FM 8-10-9). Washington, DC: Author.
- HQDA. (1995). Medical logistics policies and procedures (AR 40-61). Washington, DC: Author.

### **6.03: Ensure Proper Ward Stock Rotation and Management of Controlled Substances**

#### **Conditions**

You are given scenarios in which you must manage your ward stock levels and handle controlled substances in your field MTF.

#### **Standards**

Describe procedures for (a) ensuring that your unit has the necessary equipment and supplies for deployment, (b) maintaining accountability for controlled substances that are components of Medical Equipment Sets (MES), and (c) sustaining ward supply stockage levels in the given scenarios IAW the references.

### **Enabling Learning Objectives**

#### **Action 1**

**Conditions.** You are given a scenario in which you must ensure that your unit has the necessary equipment and supplies needed for deployment.

**Standards.** Describe factors to consider when preparing expendable and non-expendable medical supplies and equipment for your unit's deployment in the given scenario IAW the references.

#### **Description of Action 1.**

1. Medical equipment sets (MES) and supplies should be pre-packed to meet mission requirements. Functional packing lists are prescribed by unit SOP.
2. MES components should be inventoried against current assemblage configuration to ensure readiness and maintain accountability as follows:
  - a. Every 6 months for AC units
  - b. Every 12 months for RC units.
3. Unit expendable and non-expendable supplies may not be on hand due to funding. Unit contingency plans may call for phased deployment of the unit. Having first increment stockage levels is important.
4. Have Theater Army Medical Management Information System (TAMMIS)-generated customer reorder lists prepared for immediate use upon deployment with a copy furnished to your supporting supply activity.

### Action 2

**Conditions.** You are given a scenario in which you must develop a plan for storing controlled medical items that are components of medical equipment (MESs).

**Standards.** Describe proper storage plans for controlled medical items that are components of MESs in your unit in the given scenario IAW the references.

#### Description of Action 2.

1. Controlled medical items as components of MES must be stored to provide the best security possible.
2. When operational readiness of a TOE unit requires that the controlled medical item in a MES be maintained in the unit, the unit commander will store the controlled items IAW AR 40-61.
  - a. If possible, controlled item components will be extracted from the MES for special storage.
  - b. If controlled item components cannot be extracted from the MES, the entire MES will be stored in the most secure manner possible.
3. A record of controlled medical items will be kept on DA Form 3862 (Controlled Substance Stock Record). A monthly inspection and inventory will be accomplished by a disinterested officer appointed by the commander.
4. Where unit storage security is inadequate and operational readiness is not unduly compromised, controlled items should be stored at the lowest supply level having adequate storage facilities.

### Action 3

**Conditions.** You are given a scenario in which your unit is deployed and you must sustain TOE hospital ward supply stockage levels.

**Standards.** Describe your unit's ward supply stockage levels and your policy for ensuring maximum ward stock supply rotation in the given scenario IAW the references and unit SOP.

#### Description of Action 3.

1. For deployment, the 3 DOS found in the DEPMEDS ICU, ICW, or MCW MMS assemblage lists should be the objective stockage level.
2. Dated and deteriorating items should be maintained based on unit SOP.

3. Reordering is coordinated through the unit's supply and service branch, allowing interface between the unit and the supporting Med Log Bn (Forward) to occur.
4. With the advent of Prime Vendor, the Installation Medical Supply Activity (IMSA) may no longer maintain the necessary stockage levels to support build-up restockage for deployment. This may be handled through contingency contracts put in place between the IMSA and the Prime Vendor contractor.

#### References

DMSB. (1994). DEPMEDS administrative procedures and clinical and support guidelines (3rd ed. draft). Fort Detrick, MD: Author.

HQDA. (1995). Combat health logistics in a theater of operations: Tactics, techniques, and procedures (FM 8-10-9). Washington, DC: Author.

HQDA. (1995). Medical logistics policies and procedures (AR 40-61). Washington, DC: Author.

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## D. Infection Control Functions

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### 7.01: Apply Infection Control Guidelines to Patient Care

#### Conditions

To maintain the combat readiness of troops and hospital personnel, nursing personnel must follow guidelines designed to prevent the transmission of pathogenic organisms in a field environment. You are given scenarios in which you must provide patient care IAW infection control guidelines.

#### Standards

Describe infection control guidelines for providing patient care in your role in the given scenarios IAW the references.

### Enabling Learning Objectives

#### Action 1

**Conditions.** You are providing patient care in your role in a field environment and you know that handwashing is the single most important measure you can use to prevent the spread of infection. Given a patient care scenario in which you must use field devices and cleansing substitutes for handwashing.

**Standards.** Describe the principles of handwashing and the field devices and cleansing substitutes you would use in the given scenario IAW the references.

#### Description of Action 1.

1. The principles of handwashing include the following:
  - a. Handwashing should be done frequently by health care providers, to include at the beginning and end of duty; between every contact with different patients; before and after contact with any patient equipment or personal effects which might be contaminated with secretions, excretions, and/or drainage; when hands are dirty; before and after using the latrine; before and after eating; after coughing, sneezing, or blowing your nose.
  - b. There are two types of handwashing: Routine and invasive procedure scrub.

- c. Handwashing should be done under running water using soap and friction.
  - d. Wet hands, apply soap, scrub for 60 seconds. Clean under fingernails and between fingers.
  - e. Rinse thoroughly and dry with a paper towel. Use paper to turn off faucets.
  - f. An invasive procedure handwash using Betadine Scrub or Hibiclenz or other antimicrobial soap is necessary before performing invasive procedures such as inserting a Foley catheter or performing tracheostomy care, IV access care, dressing changes, wound care, or catheter irrigation.
2. Running water and/or the usual cleansing materials are not always available in a field environment.
- a. Many devices may be rigged to facilitate handwashing, such as suspending 5 gallon cans from trees or supports or dipping water out of a 32-gallon can into a smaller can (#10) with holes in the bottom. See FM 8-505 for an explanation of how to set up these and other field handwashing facilities.
  - b. There are commercial products for washing hands such as Cal Stat and Hibistat. The latter is on the DEPMEDS unit assemblage listing (UAL).
  - c. An alcohol-based cleanser may need to be used in the absence of soap and water. However, Betadine and Isopropyl Alcohol are not the first choice for handwashing because their action depends on air drying over a period of time for the greatest efficacy.

#### Action 2

**Conditions.** You are given a scenario in which you must apply infection control guidelines as they pertain to your patient care role in your field unit/MTF.

**Standards.** Describe guidelines for maintaining infection control standards in the given scenario IAW the references.

#### Description of Action 2.

1. The primary infection control guideline is to do no harm. Therefore, it is necessary to guide all activities toward a positive outcome.
2. Aseptic technique is used whenever a procedure is required that exposes the patient to pathogens. Exposure to pathogens usually is caused by a break in the integrity of the body's natural immune system, such as the skin. Procedures requiring aseptic technique include intravenous access (IV

insertion), dressing changes, wound irrigation or debridement, surgery, suturing a wound, and inserting a Foley catheter.

3. Intravenous (IV) access: IV fluids should be changed every 24 hours. IV catheters should be assessed daily to monitor for infiltration, phlebitis, and local infection. IV tubing, IV piggyback tubing, IV catheters, and IV sites should be changed at a minimum every 72 hours or sooner if needed. IV therapy should be initiated under aseptic conditions whenever possible. An IV line initiated under dirty conditions should be changed as soon as possible. IVs started in the field/prehospital areas are presumed to be started under dirty conditions.
4. Medical and surgical patients should be segregated whenever possible.
5. Barriers can be used to remind personnel that there is an infectious process which they should be aware of, but disease-specific isolation should be the technique performed. Disease-specific isolation conserves supplies in the field environment.
6. Trauma patients or patients whose skin integrity has been disrupted are at high risk for infection. Immobile patients are also at increased risk. These patients should be kept as clean as possible by personal hygiene. Complete baths of unconscious post-operative patients should be given every 2 days and partial baths should be given on the other days. Assisted and unassisted baths should be done daily for all other patients. Attention to detail during clean and aseptic nursing procedures for these patients can reduce the risk of infection. Patients should be encouraged to increase their mobility as soon as possible, and passive activities should be provided until then.
7. The environment in which patients are cared for must be kept as clean as possible with equipment damp wiped with a disinfectant between patients, bedside areas kept uncluttered and clean, floors wet mopped, and trash collected frequently and disposed of IAW SOP.
8. Traffic patterns throughout the unit should be designed to avoid areas with the most susceptible patients, or these patients should be positioned farthest away from high traffic areas in the section.

### Action 3

**Conditions.** You are given a scenario in which you must set up isolation areas in your field MTF for several patients with communicable diseases, others with contaminated wounds, another who may be immunocompromised, and several with fresh post-operative surgical wounds.

**Standards.** Apply principles of isolation to setting up isolation areas for patients in the given scenario IAW the references.

#### Description of Action 3.

1. Disease-specific isolation precautions are the recommended means of isolation in a field facility. It is most easily done and is cost effective. You only apply the protection against the means of contamination. Disease specific isolation utilizes those precautions (i.e., gown, mask, gloves) needed to interrupt transmission of the infection.
2. Universal precautions are used to the greatest extent possible as follows:
  - a. Gloves are used for any contact in which exposure to blood and/or body fluids may occur.
  - b. Protective masks and eye protection are used when splash or spray of body fluids or blood may occur.
  - c. Gowns, aprons and eye protection are used when there is a likelihood of splash or spray. Arms should be covered.
  - d. Linen and waste should be isolated and marked.
3. Examples of disease specific isolation principles are as follows:
  - a. Immunocompromised patients are at greatest risk for contracting infections and therefore must be isolated totally from contagious patients. If their condition is long-term, they need to be evacuated as soon as possible.
  - b. Respiratory patients with like symptoms can be isolated on a separate ward. Patients with other communicable diseases can be separated by additional space to remind people that there is a contagion present and to adhere to the universal and disease specific precautions.
  - c. Patients with fresh, clean post-operative wounds can be on the same ward together. This should not pose a problem as long as aseptic technique is used for dressing changes and good handwashing techniques are used between patients.

#### Action 4

**Conditions.** You are given a scenario in which you must interface with preventive medicine personnel in your unit to develop and implement your infection control guidelines.

**Standards.** Describe the responsibilities of preventive medicine personnel in the given scenario IAW the references.

#### Description of Action 4.

1. The mission of preventive medicine personnel is to increase combat readiness by reducing the percentage of disease and nonbattle injuries (DNBI). Their responsibilities include the following:
  - a. Surveillance, monitoring and consultation for troop health and disease prevention and outbreaks.
  - b. Area pest treatment, including spraying for mosquitos, rodent control, etc.
  - c. Teaching preventive medicine techniques, monitoring immunization status, and training personnel in the use of personnel protective measures (PPM).
  - d. Collecting and analyzing data, determining the medical threat, and advising the commander on disease prevalence, temperature injuries, etc.
2. The field sanitation team is not an asset of the preventive medicine section or unit that is sent miraculously to any unit that needs one. A field sanitation team is a team comprised of unit members whose additional duties are to be a field sanitation team member.
  - a. The field sanitation team is responsible for those preventive medicine measures that affect units as a whole or are beyond the resources of the individual soldier. Their duties include basic sanitation and arthropod and rodent control.
  - b. The role of the field sanitation team is to aid the unit commander in protecting the health of the command. This is accomplished by ensuring that -
    - (1) Appropriate field sanitation facilities are established and maintained.
    - (2) Effective sanitary and arthropod and rodent control measures are applied.
    - (3) Effective preventive medicine measures are practiced.
  - c. The field sanitation team will also provide information to the commander to report up through command channels with respect to the health of his command.
  - d. Field sanitation teams are trained by preventive medicine personnel and should seek advice and guidance from them.

3. The individual's responsibility is to follow training guidelines on PPM.
  - a. Personnel are routinely briefed by the field sanitation team, the commander and others on the medical problems of their operational area--e.g., what diseases are endemic, how they are transmitted, what places to stay away from, the types of insects and plants to beware of. They are issued sprays and prophylactic medicines, and advised on personnel hygiene, water consumption etc.
  - b. The field sanitation team monitors individual compliance with training.
  - c. Contaminated water and food sources are the primary causes of enteric disease contracted by US soldiers overseas. These diseases could be avoided by complying with field sanitation team guidance.
4. Consider water purification and resupply issues.
  - a. The Corps of Engineers selects sources of water with information given to him by AMEDD personnel.
  - b. The Quartermaster Corps sets up and operates bulk water treatment equipment. They procure, treat, and distribute treated water.
  - c. Once the water is received at the unit level, it is the commander's responsibility to ensure that -
    - (1) There is an adequate supply of safe drinking water.
    - (2) Soldiers are trained in the testing and purification of water in smaller amounts so that if an alternate source of water is located it can be tested and used.
  - d. Because water that has been standing for a time can become contaminated, routine tests of stored water should be done. The field sanitation team is responsible for testing the water at unit level and purifying as necessary.

### References

American Hospital Association. (1979). Infection control in the hospital, Chicago, IL: Author.

Centers for Disease Control. (1983). Guideline for isolation precautions in hospitals. Infection Control, (4, special supplement), 245-325.

Centers for Disease Control. (1986). CDC Guidelines for the prevention and control of nosocomial infections: Guideline for handwashing and hospital environmental control, 1985. American Journal of Infection Control, 14, 110-129.

Centers for Disease Control and Prevention. (1994). Draft guidelines for isolation precautions in hospitals. Federal Register, 59(214), 55552-55562.

DMSB. (1994). DEPMEDS administrative procedures and clinical and support guidelines (3rd ed. draft). Fort Detrick, MD: Author.

HQDA. (1984). Field manual: Medical specialist (FM 8-230, pp. 14-17 - 14-26). Washington, DC: Author.

HQDA. (1989). Army medical field feeding operations (FM 8-505). Washington, DC: Author.

HQDA. (1989). Field hygiene and sanitation (FM 21-10). Washington, DC: Author.

HQDA. (1989). Unit field sanitation team (FM 21-10-1). Washington, DC: Author.

HQDA. (1990). Medical services: Preventive medicine (AR 40-5). Washington, DC: Author.

HQDA. (1993). Area support medical battalion: Tactics, techniques, and procedures (FM 8-10-24, Appendix B). Washington, DC: Author.

## **7.02: Apply Principles of Asepsis to Sterile Procedures**

### **Conditions**

You are given scenarios in which you have received wounded in action (WIA) and DNBI patients in your field MTF and you must perform aseptic procedures, clean and sterilize surgical instruments, and check the sterility of supplies.

### **Standards**

Apply principles of asepsis to the sterile procedures in the given scenarios IAW the references.

### **Enabling Learning Objectives**

#### **Action 1**

**Conditions.** You are given a scenario in which you are required to perform sterile procedures in your field MTF.

**Standards.** Describe the application of principles of asepsis to the sterile procedures in the given scenario IAW the references.

#### **Description of Action 1.**

1. Principles of asepsis that should be applied to aseptic procedures in a field environment include the following:
  - a. Keep the area clean from contaminated material and uncluttered.
  - b. Establish barriers (if possible) between the patient being treated and other patients in the area.
  - c. Bring all necessary material to the bedside.
  - d. Wash hands. Always keep hands in sight at waist level or higher.
  - e. Don gloves (as well as mask, eye protection and gown, depending on the procedure).
  - f. Establish a sterile field. Open packs away from your body. Do not reach across the sterile field.
  - g. Keep sterile field in view at all times.
  - h. Establish an area away from the work area for waste.
  - i. Try to expedite the procedure, reducing the time of exposure to pathogens.
  - j. Inspect and make a mental note of what you see and what you do so you can write a note about the procedure.
  - k. If there is any doubt about the sterility or cleanliness of an object, assume that it is contaminated.

### Action 2

**Conditions.** You are given a scenario in which surgical instruments have been used during an operative procedure in a surgical area in your field MTF.

**Standards.** Describe appropriate procedures for cleaning and sterilizing the surgical instruments, equipment, and surgical area in the given scenario IAW the references.

#### Description of Action 2.

1. All instruments and equipment should be cleaned and steam autoclaved when possible as follows:
  - a. Surgical instruments must be washed first to remove contamination, such as blood, dirt, and mucus, with soap and water. An ultrasonic cleaner should be used whenever available.
  - b. Instruments used for invasive procedures must be autoclaved by a steam sterilizer.
  - c. Glutaraldehyde is a chemical disinfectant sometimes used for high level disinfection of equipment or instruments that cannot tolerate the high temperatures of steam sterilization.
2. All equipment contaminated by a patient's blood or body fluids should be terminally cleaned using a cleaning substance such as WexCide, a 2% phenolic solution. Equipment should be broken down as much as possible and the pieces cleaned, inspected, and reassembled.

### Action 3

**Conditions.** You are given a scenario in which you are preparing for a surgical procedure outside of the operating room, and you have obtained a surgical set and sterile supplies from your storage area.

**Standards.** Describe how you would check the sterility of the surgical set and supplies and list actions you would take if they appear to be contaminated in the given scenario IAW the references.

#### Description of Action 3.

1. The surgical set and supplies must be examined for signs of contamination.
  - a. The surgical set and supplies should be dry, and if sealed in a plastic wrapping, the wrapping should be clear and should not have any cracks or breaks.
  - b. The surgical set should have a label identifying the contents, load control number, and expiration date. The control number for the surgical set should be annotated in the patient's record.

- c. There should be a chemical indicator inside the wrapping indicating that the proper conditions have been met during the sterilization cycle.
2. When there are signs that the surgical set and/or sterile supplies may be contaminated, they should be returned for reprocessing.
  - a. If after a set has been used it is determined that there was a problem in sterilization, Central Matériel Supply (CMS) personnel should obtain the load control number and location of the set from the log book and notify the section to which the set was issued. Surgical sets with the same load control number need to be recalled.
  - b. The infection control officer should be notified so that patients who had a procedure using a contaminated set can be monitored for signs of infection or other untoward reaction secondary to contamination.

#### References

Atkinson, L. J., & Kohn, M. L. (1986). Berry and Kohn's introduction to operating room technique (FM 8-73). New York: McGraw-Hill.

Centers for Disease Control. (1986). CDC Guidelines for the prevention and control of nosocomial infections: Guideline for handwashing and hospital environmental control, 1985. American Journal of Infection Control, 14, 110-129.

HQDA. (1979). Centralized matériel service/section (FM 8-38). Washington, DC: Author.

HQDA. (1984). Field manual: Medical specialist (FM 8-230). Washington, DC: Author.

## **7.03: Use Proper Disease Prevention and Surveillance Procedures**

### **Conditions**

You are given scenarios in which there may be a trend in the incidence of patients with the same diagnosis in your field unit/MTF.

### **Standards**

Describe the elements of a medical threat and appropriate identification and reporting procedures for suspected trends in diseases or injuries in your patient population in the given scenarios IAW the references.

## **Enabling Learning Objectives**

### **Action 1**

**Conditions.** You are given a scenario describing the field environment in which you are providing patient care.

**Standards.** Describe elements of a medical threat in the given scenario IAW the references.

### **Description of Action 1.**

1. Medical threat is "all ongoing or potential enemy actions or environmental conditions that reduce the effectiveness of soldiers, such as sustained wounds, injuries, or diseases" (FM 8-10, p.1-2).
2. Elements of medical threat include the following:
  - a. Naturally occurring infectious diseases, including acute diarrhea, acute respiratory diseases, malaria, arbovirus infections, leishmaniasis.
  - b. Environmental extremes (i.e., heat, cold, humidity, high altitudes).
  - c. Battle injuries.
  - d. Nuclear/biological/chemical threat.
3. During military operations that involve humanitarian aid, the most significant elements of medical threat include:
  - a. Naturally occurring infections due to poor hygiene, sanitation, and overcrowding.
  - b. Environmental extremes (i.e., extreme heat or cold). Heat injuries can occur before soldiers have time to become acclimatized to the environment. This may contribute to performance degradations.

## Action 2

**Conditions.** You are given a scenario in which your unit has had a 25% increase in admissions of DNBI patients within the last 48 hours.

**Standards.** Describe proper identification and reporting procedures for an increased incidence of DNBI in the given scenario IAW the references.

### Description of Action 2.

1. The medical unit should maintain log books to identify trends in type of illness or injury and/or in soldiers with a similar problem from the same unit.
  - a. Each section should maintain a log book to track the patients admitted, transferred in, and transferred out. The information should include name, PAD number, diagnosis, and soldier's unit.
  - b. When a patient is discharged, transferred out, air evacuated, or expires, the log entry should indicate date, time, and destination.
2. Trends may indicate the following factors:
  - a. Breakdown in field sanitation procedures, unit preventive medicine measures, or personal hygiene measures.
  - b. Enemy activity, such as the use of contamination or biological weapons to decrease our combat effectiveness.
3. Trends must be addressed through channels to reduce any preventive problems or to alert our forces of suspected enemy activity.
  - a. Discuss suspected trend with ward or unit physician.
  - b. Confirm suspicions with more definitive information, such as culture results or lab tests.
  - c. If information indicates a trend, preventive medicine personnel should be notified to conduct epidemiological surveys.
  - d. If the trend is a psychological indicator--such as increasing numbers of suicide attempts or self-inflicted injuries or illnesses--the mental health section or combat stress control unit should be notified.

### References

- HQDA. (1990). Medical services: Preventive medicine (AR 40-5). Washington, DC: Author.
- HQDA. (1991). Health service support in a theater of operations (FM 8-10). Washington, DC: Author.
- HQDA. (1991). Medical intelligence in a theater of operations (FM 8-10-8). Washington, DC: Author.

## **7.04: Manage Field Waste**

### **Conditions**

You are given scenarios in which your unit/MTF must use proper management procedures for waste generated in the field environment (i.e., field waste).

### **Standards**

Describe the types of field waste generated in your unit/MTF and describe proper procedures for safe handling and disposal of this waste in the given scenarios IAW the references.

**Note.** Mr. John Resta and Mr. Mike Diem, Hazardous & Medical Waste Program, US Army Center for Health Promotion and Preventive Medicine (USACHPPM), Aberdeen Proving Ground, MD are acknowledged for their contributions to this task summary. These individuals are a good resource for further information regarding the management of hazardous and medical waste.

### **Enabling Learning Objectives**

#### **Action 1**

**Conditions.** You are given a scenario in which your unit/MTF is accumulating waste in a field environment.

**Standards.** Describe the categories of field waste generated by your unit/MTF and list those who are responsible for disposal of this waste in the given scenario IAW the references.

#### **Description of Action 1.**

1. The accumulation and disposal of waste is a major problem in an area of operations/theater of operations for the following reasons:
  - a. The waste has an impact on military operations.
  - b. The waste serves as a breeding ground for rodents and arthropods.
  - c. Accumulation of the waste contributes to environmental contamination.
2. When Armed Conflict has occurred so as to substantially disrupt the infrastructure, waste disposal activities must continue. However, the support mechanisms to achieve rigorous compliance with requirements may not be immediately available. Therefore alternative arrangements may be needed, exceptions to policy may need to be requested, and variances may need to be proposed for approval. The most important immediate consideration (in the absence of other information and guidance) is to take reasonable and prudent action in a manner that **does not pose harm** to human health or to the environment.

3. Army policy is that all waste will be disposed of in an environmentally acceptable manner consistent with good sanitary engineering principles and the accomplishment of unit mission. While operating OCONUS, either in training or actual contingency operations, the theater commander will determine the applicability of both US and host-country policies.
  - a. Depending on the nature and volume of waste created, units generating the waste are normally responsible for its collection and disposal.
  - b. Certain types of waste require special handling that may be beyond the capability of the unit or facility. Units generating larger amounts of waste, such as hospitals, may not have the resources or equipment to properly dispose of solid waste. In these cases, supporting engineer units should be contacted to provide waste disposal support.
4. Waste stream segregation between hazardous, medical and solid waste will greatly increase the ease of final disposal by preventing further cost and segregation problems.
5. Landfill sites should be located such that they are downwind of troop concentrations and far enough away to preclude potential harm from pest infestation. It may not be feasible to line a landfill in the field, therefore extra precautions should be employed. Landfills should be kept away from surface water sources and wetlands. Waste disposal points should be well marked stating what is accepted. The landfill should not accept medical waste (unless it has first been burned or treated to kill germs), or hazardous waste, to include waste oil, waste solvents, and battery acid.
6. The trash of US service members may be considered a valuable commodity. Facilities should be manned to ensure security and to enforce proper segregation practices.
7. If the means of disposal is burning in a landfill, extreme caution should be used to ensure that no potential hazards enter the waste stream (e.g., flammables, combustibles, explosives). FM 8-250 provides further guidance regarding landfill construction.
8. As an adjunct to existing Army manuals on field sanitation, there is a Field Operations Guide for Disaster Assessment and Response published by the Bureau for Humanitarian Response of the US Agency for International Development (USAID). In this Guide there is a section on Sanitation and Environmental Service. This section and other discussions in the Guide may be helpful with some situations that could arise.
9. Waste can be subdivided into the following five categories:
  - a. **General waste** - Waste not specifically classified as medical waste or hazardous waste. It includes such items as --
    - (1) Paper and plastic products (which are by far the most abundant solid waste generated in a field environment).
    - (2) Garbage (generated by dining facilities).

- (3) Scrap material (wood, metal, and so forth).
- b. **Hazardous waste** - Waste which is either ignitable, corrosive, reactive, toxic or which is specifically listed as a hazardous waste, and which requires special handling, transportation, disposal, and documentation in its management. Examples include many solvents, chemicals, and petroleum, oil, and lubricants (POL).
- c. **Medical waste** - Waste which is potentially capable of causing disease in man and may pose a risk to individuals or community health if not handled or treated properly. Depending on your jurisdiction, the terms medical waste, Regulated Medical Waste, and infectious waste have virtually the same meaning. The term Regulated Medical Waste as defined in HSC Reg 40-35 applies to fixed facilities, but it also can apply to field medical facilities.
- d. **Human waste** - Waste which is comprised of feces and urine.
- e. **Wastewater** - Liquid waste generated by laundry, shower, food service, and routine MTF operations.

**Note.** Nonmedical solid waste (general and hazardous waste) can be generated by any military unit. Medical waste is only generated by medical elements, such as treatment, research, and laboratory facilities. Supporting engineer and preventive medicine personnel can provide guidance and assistance on the handling, processing, and disposal of waste.

### Action 2

**Conditions.** You are given a scenario in which you must differentiate between procedures used to manage general and hazardous waste in your unit in a field environment.

**Standards.** Describe the sources of general and hazardous waste, the efforts you will make to reduce the amounts of waste generated, and the proper procedures for managing general and hazardous waste in the given scenario IAW the references.

#### Description of Action 2.

1. General and hazardous waste are produced by all military units. Control and disposal of these types of waste require planning and the development of unit standard operating procedures (SOPs).
2. The primary sources of general and hazardous waste are as follows:
  - a. Routine troop support operations.
  - b. Maintenance and motor pool operations.
  - c. Administrative functions.

- d. Dining facility operations.
  - e. Medical treatment facilities.
3. In all of the above operations and functions, a major effort must be made to reduce the amount of waste generated and thus to lessen the burden on the disposal system.
4. Disposal of general and hazardous waste: Most general waste is buried or burned by the generating element. It can be transported in organic vehicles to a waste disposal point (sanitary landfill). It is important to remember that vehicles used to transport waste must be cleaned and sanitized before being used for rations or patient transportation operations. During training exercises, supporting engineers are responsible for the construction and operation of the landfills.
- a. Putrescible waste from dining facilities, while not hazardous or infectious in and of itself, can become both a serious aesthetic problem, as well as a breeding site for disease-carrying rodents and arthropods. This class of solid waste must be removed and disposed of after every meal. Burial of this type waste should be at least 30 yards (or meters) from the food service facility. Normally, one garbage pit is required per 100 soldiers per day (FM 21-10-1).
  - b. Used oil and petroleum, oil, and lubricants (POL) products are classified as hazardous wastes. Other types of hazardous waste may be generated, such as solvents, alcohols, tissue-fixing solutions, and spent X-ray fixer. Hazardous waste must NEVER be discharged onto the ground, buried in a hole, or added to regular wastewater. Normally it is collected, labeled with contents of the container, turned in through logistics channels, and routed through the Defense Reutilization and Marketing Office (DRMO) for disposal. Other disposal methods can be used, but they must be approved by the Theater chain of command. Disposal methods for this waste must comply with federal, state, local, and host nation regulations. Military engineer and preventive medicine support elements can advise on required disposal procedures.

### Action 3

**Conditions.** You are given a scenario in which you must use proper procedures for managing hazardous waste in your unit.

**Standards.** Describe proper procedures for handling and disposing of hazardous waste in the given scenario IAW the references.

#### Description of Action 3.

1. It is important to properly containerize, store, and ultimately transport the hazardous waste to a location where proper disposal can be conducted. The supporting DRMO has the responsibility to

accept accountability and provide a disposal service for hazardous waste. The working channels are between medical logistics and the DRMO.

2. Containerize the waste. Be sure the container is compatible with the waste. Do not co-mingle a variety of different waste streams together. This may produce an incompatible mixture which poses health or explosion hazards and which may be incredibly difficult and expensive to manage later.
3. Label the waste. Any container of hazardous waste must be labeled as to the contents. The label should say something like, "Waste ... (what the material is)." The label method must allow a person to know what is in the container. For example, "Waste Xylene," or "Waste Alcohol," or "Waste mixture of ## percent (this) and ## percent (that)." Used oil (such as from the crankcase of vehicles) in drums should be labeled as "Used oil".
4. Package the waste properly. Drums, barrels, and cans/bottles of the waste must have covers/caps/lids which must be in place and fit snugly except when waste is added or removed.
5. Store the hazardous waste so that the containers are protected from weather. Use a Pole Barn if indoor storage is not available. When prudent, place tarps or other covering over drums to protect from solar heating or rainfall. Store safely with due consideration toward compatibility of the different kinds of containerized wastes. Consider the implication if a rupture of a container should occur and take steps beforehand to mitigate the impact. Have secondary containment (dikes, berms, or other means) for containerized hazardous waste whenever possible.
6. Develop emergency response procedures for situations in which a spill might occur. Determine the actions that should be taken. Can the spill be handled safely by soldiers in the immediate area? The answer to this question will depend on what is spilled and how much. Train all soldiers to respond to spills that they can safely handle. There are four basic steps:
  - a. Protect yourself. Use the personal protective equipment specified in the material safety data sheet for the material spilled. If the spill occurs in a work area, you should already be wearing the necessary equipment or it should be available on the spill cart.
  - b. Stop the flow. This may be as simple as placing the container upright or closing a valve.
  - c. Contain the spill. Place absorbent material or sandbags around the edge of the spill or place an empty container under the leak. Protect drains and ditches.
  - d. Report the spill. Notify your supervisor and the unit spill response coordinator.

**Note.** After these four steps are completed, you may be instructed to clean up the spill. Be sure you choose cleanup equipment carefully. Use non-sparking tools if the material is flammable or explosive. For corrosive materials, choose tools that won't deteriorate (e.g., non-metallic tools). Ask what you

should do with the spilled material and absorbent. It may have to be turned in to the DRMO for proper disposition.

7. Work with existing logistics channels and DRMO personnel to arrange the proper marking, labeling, manifesting, and shipping papers when preparing the hazardous waste for transportation to treatment, storage, and disposal facilities.

#### Action 4

**Conditions.** You are given a scenario in which you must use proper procedures for handling, transporting, and disposing of medical waste in your unit/MTF in a field environment.

**Standards.** Describe the types of medical waste in your unit/MTF and proper procedures for handing, transporting, and disposing of the waste in the given scenario IAW the references.

#### Description of Action 4.

1. Medical waste (formerly called infectious or infectious medical waste) is waste which is potentially capable of causing disease in man and may pose a risk to individuals or community health if not handled or treated properly. Remember that for waste to be capable of producing disease, it must contain pathogens of sufficient virulence to result in an infectious disease in a susceptible host. Depending on your jurisdiction, the terms medical waste, Regulated Medical Waste, and infectious waste have virtually the same meaning. The term Regulated Medical Waste as defined in HSC Reg 40-35 applies to fixed facilities, but it also can apply to field medical facilities.
2. The major sources of medical waste are patient care areas, especially the emergency room or EMT/triage areas, ORS, and ICUs. Medical wards and laboratories also are medical waste generators. The actual amount of medical waste generated is dependent on the extent and nature of medical activities.
3. Responsibilities for the disposal of medical waste are as follows:
  - a. The hospital commander is responsible for implementing policies for medical waste management to include -
    - (1) identification.
    - (2) segregation.
    - (3) handling.
    - (4) storage.
    - (5) disposal.
    - (6) transportation.

- b. The preventive medicine advisor is responsible for providing the commander with technical guidance on properly managing medical waste.
  - c. Medical treatment personnel are responsible for the proper identification, segregation, and handling of medical waste generated during patient care.
  - d. Medical logistics personnel are responsible for the handling, transportation, and disposal of the medical waste.
- 4. **Types of medical waste.** Following are six classes of medical waste (as specified in HSC Reg 40-35) that require proper handling and disposal techniques. At fixed facilities, these classes of medical waste are often referred to as Regulated Medical Waste because of regulatory requirements to manage them in the proper ways.
  - a. **Class 1 - Cultures, Stocks, and Vaccines.** Cultures and stocks of infectious agents and associated biologicals, including cultures from medical and pathological laboratories; discarded live and attenuated vaccines; and culture dishes and devices used to transfer, inoculate, and mix cultures. (All other lab waste except Class 2 and Class 3 is considered general waste.)
  - b. **Class 2 - Pathological Waste.** Human pathological wastes, including tissues, organs, body parts, extracted human teeth, and body fluids that are removed during surgery or autopsy, or other medical procedures, and specimens of body fluids.
  - c. **Class 3 - Blood and Blood Products.**
    - (1) Free flowing liquid human blood, plasma, serum, and other blood derivatives that are waste (e.g., blood in blood bags, blood and/or bloody drainage in suction containers).
    - (2) Items such as gauze or bandages, saturated or dripping with human blood, including items produced in dental procedures, such as gauze or cotton rolls saturated or dripping with saliva.

**Note.** The following items saturated or dripping with blood are not subject to the requirements of this regulation: Products used for personal hygiene, such as diapers, facial tissues, and sanitary napkins.

- (3) Items caked with dried blood and capable of releasing the blood during normal handling procedures.
  - d. **Class 4 and Class 7 - All Used and Unused Sharps.** Sharps used in animal or patient care or treatment in medical, research, or support laboratories (including hypodermic needles, syringes (with or without the attached needle), Pasteur pipettes, scalpel blades, blood collection tubes and vials, test tubes, needles attached to tubing, and culture dishes (regardless of

presence of infectious agents)). Other types of broken or unbroken glassware that were in contact with infectious agents (i.e., used slides and cover slips).

- e. **Class 5 - Animal Waste.** Contaminated animal carcasses, body parts, and bedding of animals known to have been exposed to infectious agents during research (including that produced in veterinary facilities), production of biologicals, or testing of pharmaceuticals. Specify if this type of animal waste is generated at this facility.

**Note.** Carcasses of road kills, euthanized animals, animals dying of natural causes, and waste produced by general veterinary practices are not considered Class 5 animal waste.

- f. **Class 6 - Isolation CDCP Risk Group IV Waste.** Biological waste and discarded materials contaminated with blood, excretion exudates, or secretions from humans who are isolated to protect others from highly communicable diseases, or isolated animals known to be infected with highly communicable diseases caused by agents designated by CDCP as Class 4 in Classification of Etiologic Agents on the Basis of Hazard (1974). This category includes pox viruses and arboviruses.

5. Procedures for handling medical waste are as follows:

- a. Personnel must use universal precautions when handling, transporting, and disposing of medical waste. Precautions should include use of gloves, disposable mask, butyl rubber apron, or other protective equipment as directed by unit SOP.
- b. Keep medical waste segregated from regular trash starting at the point of generation, and continuing during storage, in transportation, and through the point of treatment.
  - (1) Medical waste is collected in impervious containers lined with leak-resistant bags. The containers are clearly marked as medical waste with the universal biohazard symbol. After being filled to two-thirds capacity, bags are sealed by lapping the gathered open end and binding with tape or a closure device. This ensures that liquid waste cannot leak. A method of segregating medical waste from general waste is the use of distinctly colored bags (red) to package and contain medical waste.
  - (2) Needles and sharps are placed in a rigid-walled, puncture-resistant red containers that are clearly marked with the universal biohazard symbol. The containers should be sealed when 3/4 full.
  - (3) If red bags or the customary sharps boxes are temporarily not available locally, use some other readily recognizable and identifiable way of distinguishing packaged medical waste from regular trash.

**Note.** Needle/syringe clippers are NOT authorized for use.

- (4) Blood, blood products, and semi-solid waste are placed in unbreakable capped or stoppered containers.
  - (5) Pathological waste is stored in refrigerated containers (NTE 30 days).
- c. Medical waste is stored in designated areas, either secured or under direct physical control.
  - d. Medical waste should be removed from the point of generation at least every 8 hours (see 6b below) and disposed of at least every 24 hours.
6. Personnel should be assigned and trained in collecting and transporting medical waste.
- a. Handling should be kept to a minimum.
  - b. Regular, frequent collection times should be arranged to ensure waste does not remain in the section longer than 24 hours for general waste, 8 hours for medical waste, 30 days for sharps and pathological waste.
  - c. The transportation of medical waste within the hospital should be in rigid, leakproof, closed containers, marked and used exclusively for its transport.
  - d. Vehicles used to transport medical waste to disposal sites must not be used to transport rations, clean laundry, medical supplies, or used for other purposes until after it has been thoroughly cleaned and sanitized using a 5% chlorine solution (48 ounces of chlorine granules in 5 gallons of water).
7. The purpose of properly treating and disposing of medical waste is to make it nonpathogenic, unrecognizable, and unusable (e.g., sharps). Depending on the quantity and type of waste, command policies, and availability of disposal facilities and engineer support, a variety of options for treating and disposing of medical waste exist. Every effort should be made to use the safest and most complete method of treating and disposing of this waste.
- a. Medical logistics is responsible for managing and coordinating the proper disposal of excess medical matériel and waste.
  - b. Before establishing the method of disposal for medical waste, it is imperative to determine the host nation policies and procedures for waste disposal. They may not allow burning or burying. During combat, laws might be less rigid, but it is always wise to respect the host country's rules. Logistics and preventive medicine personnel determine the method of disposal according to host nation law.
  - c. All waste should be stored in a secure location where inadvertent contact by nonmedical personnel is prevented until pick-up can be accomplished.

8. For treatment of medical waste, if customary means are not available, consider the following:
  - a. Contracting, if available.
  - b. Retrograding to where facilities are available.
  - c. Burning using field expedient methods such as an inclined-plane incinerator (FM 21-10-1).
  - d. Burning in barrels or pits, if approved by local officials and other regulatory policies.
  - e. As a last resort when no treatment method is available--and with command approval--untreated waste can be buried in a sanitary landfill. Engineer support is required for construction of the waste disposal site if an existing local sanitary landfill is not used. The waste must be covered immediately with refuse (trash) and then soil to make sure the waste is not accessible to scavenging. All previous options are considered before accepting burial as the final option. If untreated waste is to be buried in a sanitary landfill, obtain **prior approval** from local public health officials. Close coordination with preventive medicine personnel and host nation authorities is essential.

**Note.** For disposal, treated medical waste (e.g., waste that is treated by burning) can be buried in a local sanitary landfill where regular trash is buried.

9. During training deployment in CONUS and training/tactical deployment in many OCONUS locations (such as European), the host nation environmental regulations are such that disposal of medical waste via field expedient methods is not permitted. Furthermore, the quantities and types of medical waste generated during training are relatively limited due to the limited amount of actual patient care. As such, the option of choice is to haul the medical waste, via military vehicle or contract services, to fixed installations (preferably large fixed medical facilities) for treatment and disposal according to command policies. While proper field medical waste techniques are difficult or against regulation to train in the field, it is still important to develop a plan for carrying out these techniques during actual medical operations. The requirements for segregating and handling waste are critical and remain an essential part of training.
10. Incineration is the method of choice for most types of medical waste, but it must be controlled. Burning medical waste requires incinerators specifically designed for the various types of medical waste. The inclined-plane incinerator with vapor burner is used as a field expedient means of treating and destroying medical waste, including sharps, during operational and training deployment. This means should be considered only when no other option is available. The inclined-plane incinerator referred to here is described in paragraph 2-23b(2) of FM 21-10-1, Unit Field Sanitation Team, October 1989. The incinerator is illustrated in a schematic drawing in Figure A-23 on page A-25 of the same Field Manual.

- a. The field expedient inclined-plane incinerator is a controlled open air burning method that can be used for burning small amounts of medical waste; however, command approval must be given prior to its use. Thorough consideration must be given to all available options before deciding to implement the open air burning method. Also, there should be no immediate plans to relocate a hospital if it is going to build and use this incinerator.
  - b. It is recommended that the waste feed to the inclined-plane incinerator be mixed at approximately 10% by weight of medical waste (to include sharps) to 90% by weight of ordinary refuse (i.e., "rubbish"). This mixture will help assure the hottest and cleanest burn possible.
  - c. The ash from burning medical waste should be shoveled into an open 55 gallon drum which, when full, would be retrograded to CONUS for burial in a sanitary landfill that meets United States operating standards. If the ash from the incinerator does **not** contain medical sharps (i.e., needles, scalpel blades, etc.), then that ash can be managed as ordinary trash and buried at designated locations in theater. Note that in all cases, ash from waste incineration must be buried.
  - d. Scavenging at landfills in theater cannot effectively be stopped or prevented after our forces depart. We wish to protect ourselves from adverse (even if frivolous) accusation in the event that a native gets cut or injured by a needle in the local landfills, even if the needle has been incinerated. It is therefore recommended that ash containing sharps be retrograded to CONUS.
11. If an incinerator is not available, steam sterilization is another viable treatment for medical waste. Autoclave bags must be used. Once steam sterilized and cooled, the waste should be managed as general refuse, with protection given to minimize people getting cut when handling it. If the sterilizer is a field sterilizer (like field medical units use), it must **NEVER** be used to sterilize surgical packs if waste has been sterilized in it; **NEVER!!** If used to sterilize waste, a field medical sterilizer **MUST** be permanently and indelibly marked and labeled as being dedicated for sterilizing waste and **ONLY** waste. Also, a problem with field sterilizers involves capacity and dependability. They don't hold a high volume, and often break down with extensive use. Be sure to have a back up plan thought out for managing waste that was intended to be sterilized in one of these field sterilizers.
- a. As with incinerator ash, sharps that have been steam sterilized can be retrograded to CONUS. Once treated, the sharps become regular trash and are not subject to the special regulatory requirements of the Department of Transportation for Regulated Medical Waste.
  - b. Although retrograding the sharps to CONUS if preferred--if necessary, burial below scavenger depth (approx. 8 ft.) is an acceptable disposal method for sharps. Preferably, this would be done in conjunction with sterilization or grinding, but it is not required. Because landfills are extremely hostile environments to human pathogens (germs), very little risk of harm to human health or the environment would result. The risk to health involves handling and moving the

waste. Once the waste is at final disposal location and covered with refuse and compacted, there is no further danger.

12. Soldiers should wear both skin protection and respiratory protection when burning medical waste. The paper surgical mask does not protect from hazards inherent in the burning of waste; to wear them leads to a false sense of benefit. Although the soldiers' protective mask has a HEPA filter, it would be an improper use of the protective mask to have soldiers wear it while burning medical waste. Furthermore, it would send a terribly misleading visual message to almost everyone to see soldiers wearing the military protective mask when burning waste. Air purifying respirators (cartridge or canister) with HEPA filters should be used if available.

### Action 5

**Conditions.** You are given a scenario in which you must use proper procedures for managing human waste in your unit/MTF in a field environment.

**Standards.** Describe proper procedures for managing human waste in the given scenario IAW the references.

#### Description of Action 5.

1. Proper human waste (feces and urine) disposal is essential to prevent the spread of diseases caused by direct contact, contamination of water supplies, or dissemination by rodents or arthropods. It is even more critical in a hospital environment because patients are more susceptible to diseases transmitted through fecal contact. All human waste must be disposed of in a manner consistent with command policy and good sanitary engineering practices.
2. The hospital commander is responsible for providing human waste disposal facilities. This may require the supporting engineer element to assist in the construction of latrine facilities.
  - a. Field medical treatment facilities (MTFs): In some locations, construction and use of actual field expedient waste facilities may be prohibited. In this case, one option is to obtain engineer support. The option of choice is to establish the hospital in an area with permanent or semipermanent latrine facilities already constructed and connected to an established sanitary sewer system. However, this may only be possible in areas designated as deployment sites. In many instances, it may be possible for hospitals to contract waste removal or latrine facilities through a host nation support contract. Procedures will vary depending on the command policy and local (host nation) agreements, but waste will still have to be separated into types by the unit. The use of chemical or self-contained toilets is another option that can be used instead of constructing field expedient latrines. In all types of arrangements, the hospital field sanitation team and preventive

medicine personnel are responsible for monitoring the achievement of field sanitation requirements (FM 21-10-1).

b. Field expedient facilities:

- (1) Selection of the type of field latrine:
  - (a) The type of field latrine selected for a given situation depends on a variety of factors, such as --
    - number of personnel (staff and patients).
    - duration of stay at the site.
    - geological and climatic conditions.
  - (b) Supporting preventive medicine personnel and the hospital's field sanitation team can assist the commander in determining the appropriate type of latrines, their locations, and size.
  - (c) Specific guidance on selection criteria for the appropriate type of latrine is provided in FM 21-10 and FM 21-10-1.
- (2) Location: Latrines should be located in a manner which prevents the contamination of food and water. Hospital latrines are located at least 100 yards (90 meters) downwind (prevailing wind) from the hospital food service facility, at least 100 feet (30 meters) from any ground water source, and at least 30 yards from the hospital perimeter but within reasonable distance for easy access (FM 21-10-1). For the FH and GH, multiple latrine sites are required due to the size of hospital layout and distances between patient care, administrative, and sleeping areas.
- (3) Maintenance: Sanitation and maintenance of the hospital's latrine facilities are critical to prevent disease transmission. Handwashing facilities must be placed at each latrine.
- (4) Closing and marking: Closing and marking of latrines will be IAW command policy and good field sanitation practice IAW FM 21-10 and FM 21-10-1.

3. Patient facilities:

- a. Ambulatory patients and staff may share latrines, but it is preferable to segregate them.
- b. The unit's field sanitation team should establish a plan for the construction of enough latrines for staff members and for the unit's maximum patient capacity. They should consider factors such as how long the hospital will be located at the site and the need to change the latrine site due to the build-up of odor after a few weeks. Male and female latrines are required. Latrines need to be close enough to the ward areas for convenience of access while maintaining distances from dining facilities, water sources, and the like.
- c. Nonambulatory patients require the use of bedpans and urinals. The sinks within a hospital should not be used for bedpan or urinal disposal or washing. Instead, one or more of the hospital latrines should be designated as a cleaning station for bedpans and urinals. This cleaning station is referred to as a *bedpan wash station* or a *hospital laundry line*. It is set up using the same approach employed to wash mess kits in the field--i.e., using 32-gallon containers and immersion

heaters (see FM 21-10-1). These 32-gallon containers must be clearly marked for use in cleaning bedpans and urinals only.

**Warning.** Personnel operating the bedpan wash station should be trained in immersion heater operation. They should understand all safety precautions for working with immersion heaters and should be equipped with appropriate personnel protective equipment (gloves, aprons, eye protection) to protect them mostly from the scalding water risks.

- (1) After bedpans and urinals have been emptied in the designated hospital latrine, they can be cleaned out (using a brush as needed) in a container designated as an initial cold rinse. Any water containing human waste left in the bedpan should be promptly (at least daily) disposed of with the other sanitary wastes in an appropriate manner (pit latrine, etc.).
- (2) One 32-gallon container should be set up with hot soapy water to serve as a wash can. The bedpans are washed in this can, using a brush as needed.
- (3) Another 32-gallon container should be set up with clear boiling water. This is the rinse can. A hook or some device should be used to dip the bedpans a few times to get the suds off.
- (4) The bedpans are sanitized by being submerged in another 32-gallon container of hot boiling water for at least 30 seconds. Again, a hook or some device should be used to prevent hand contact with the boiling water.
- (5) The bedpans are placed on tent pegs or other hanging devices to air dry.
- (6) An alternative consideration is the use of plastic bedpan liners. Also, a bedside commode lined with a plastic bag has been used on a ward (either behind a privacy screen or in a makeshift "bathroom" in one corner of the ward) for selected patients. If plastic liners are used, they will reduce the requirement for cleaning and sanitizing the bedpan or bedside commode.

**Note.** Bedpans from patients with highly infectious diseases (i.e., CDC Class IV diseases), while unlikely in a field environment, should be handled as Regulated Medical Waste unless the local infection control officer states that emptied bedpans do not pose high infectious risks.

### Action 6

**Conditions.** You are given a scenario in which you must use proper procedures for managing wastewater in your unit/MTF in a field environment.

**Standards.** Describe the proper procedures for managing wastewater in the given scenario IAW the references.

#### Description of Action 6.

1. Water usage generally results in the production of wastewater which requires disposal. Depending on the source, wastewater may contain suspended solids and particulate matter; organic material; grease; dissolved salts; biological, pathological, and pathogenic organisms; and toxic elements. Just the volume of wastewater alone, without consideration of the various contaminants, can cause significant operational problems in the field environment.
2. Requirement for disposal:
  - a. All wastewater and waterborne wastes generated in a field environment must be collected and disposed of in a manner that --
    - (1) protects water resources from contamination.
    - (2) preserves public health while minimizing mission impairment or adversely impacting on the readiness of the force.
    - (3) protects the local environment from adverse harm.
  - b. When operating OCONUS, units may have to comply with applicable host nation laws and procedures. This is determined by the theater commander. In an actual contingency operation, the theater commander (with input from the command surgeon) determines the applicability of local environmental laws in the area of operations (AO). Regardless of laws and regulations, proper disposal of wastewater is essential to protect the health of the force by precluding contamination of water supplies and development of rodent and arthropod breeding sites.
3. Responsibility for disposal: Units generating wastewater in the field are responsible for their own wastewater collection and disposal. Large volume wastewater generators, such as hospitals, may require engineer support. Theater combat engineers will provide support during OCONUS deployments or contingency operations. In any case, the hospital commander has the final responsibility for coordinating disposal of his unit's wastewater.
4. Wastewater sources and collection: Hospitals generate a significant volume of wastewater corresponding to the volume of water consumed. A conservative estimate of wastewater volume for planning purposes is that 80% of all water used (other than water used for human consumption) will end up as wastewater. The largest volumes of wastewater are generated by support operations of the hospitals such as laundry, shower, and food service operations. While this type of wastewater is not

unique to a hospital, it contributes to an enormous volume requiring collection and disposal. However, wastewater generated from direct patient care functions is unique to the hospitals and may be contaminated with blood, other body fluids, particulate matter, and potentially infectious organisms. In addition to the quantity of wastewater, an added problem is the multiplicity of sources within the hospital that contribute to the complexity of collection.

- a. Field sinks: Field sinks are a primary source of wastewater from staff handwashing, patient hygiene, instrument cleaning and the like. This liquid waste is generated intermittently and the volume is highly variable depending on the functional area and patient work load. The sinks can operate with the drain line placed in an empty 5-gallon water can. This can must be periodically emptied into a disposal system. If wastewater collection cans or the DEPMEDS wastewater collection system are not used, the sinks will drain to the immediate exterior of the hospital shelter, resulting in an unacceptable pooling of wastewater throughout the hospital area.

**Warning.** Extreme care must be taken to ensure that 5-gallon cans used for wastewater are not mistaken or confused with 5-gallon cans used for potable water. Clear labeling is critically essential.

- b. MTF sources: Sources of wastewater other than the sinks are limited and will generate relatively small volumes of waste liquids. In most cases, this wastewater can be collected and discharged into a nearby sink. An exception may be the water used for facility and major equipment sanitation, such as wastewater from washing operating room tables, operating room floors, litters, ambulances, and other medical matériel.
- c. Field showers:
  - (1) While not an actual part of the hospital system, quartermaster field showers may be located with or be near the hospital to support both patients and staff. These showers may also support personnel of other units within the area. The quartermaster personnel operating field showers are responsible for wastewater collection and disposal. In some situations, the disposal of this wastewater may be in conjunction with that of the hospital.
  - (2) If quartermaster support is not available, hospital personnel must provide their own showers (see FM 21-10 and FM 21-10-1). The hospital is responsible for the collection and disposal of this wastewater.
- d. Field laundries: The field laundry is one of the largest generators of wastewater. Field laundries may be located with or near hospitals to provide support and can present an inordinate wastewater disposal problem. Like the showers, quartermaster personnel operating laundries are responsible for wastewater collection and disposal. Because of the large volume of water required for laundry operations, the facility may have to be located away from a hospital and closer to a water source. In effect, this location would reduce or remove what may be a wastewater disposal problem from the immediate area of the hospital. (Preventive medicine personnel must ensure that laundry personnel are trained in and are properly implementing procedures for handling contaminated linens.)

e. Field kitchen: Army field kitchens are also significant sources of wastewater. In addition to the volume, the greases and particulate matter in wastewater from a field kitchen must be dealt with in a much more deliberate manner. For instance, grease traps must be constructed to remove food particles and grease from the kitchen wastewater before disposal. Information for the construction and operation of the filter and baffle grease traps is provided in FM 21-10 and FM 21-10-1. Also, hospital commanders may obtain technical assistance from the supporting preventive medicine element.

5. Disposal of wastewater.

- a. In disposing of wastewater, a number of factors should be considered. These factors include --
  - (1) volume and characteristics of the wastewater.
  - (2) operational considerations (e.g., duration of stay in a given location and the intensity of combat operations).
  - (3) geological conditions (e.g., type of terrain and soil characteristics, or depth of the water table).
  - (4) climatic conditions.
  - (5) availability of engineer support.
  - (6) accessibility of established sewage collection, treatment, and disposal systems.
  - (7) applicability of command environmental programs.
- b. In light of the above factors, there are a number of wastewater disposal alternatives that a hospital commander may select. These include --
  - (1) connection to established sanitary sewer system.
  - (2) collection and holding wastewater for engineer or host nation agency removal to a fixed treatment facility.
  - (3) an engineer-constructed semipermanent wastewater collection and disposal system.
  - (4) a unit-constructed field expedient wastewater disposal system (See FM 21-10-1).
- c. In many OCONUS noncombat operations, especially in the more developed countries, use of existing installation disposal facilities should be the method of choice. Even in some contingency operations, preplanned siting of hospitals can take advantage of preestablished connections to the existing sewer system. Coordinate with the local waste disposal facility prior to connecting to the sewer system or dumping waste into the system to ensure the facility can handle the extra waste and to ensure compliance with environmental laws. Assistance from supporting engineers is required to establish the necessary connections and access to the sewer system. However, grease traps or filters may still have to be used in some areas, such as the dining facility's wastewater stream. Traps and filters will be required to remove grease and particulate matter that would adversely affect the operation of the wastewater pumps.
- d. If use of a host nation sewer is possible, but direct connection is not readily available, an alternate approach is to consolidate and collect wastewater in containers for eventual removal to a sewage treatment plant or a sanitary sewer access by supporting engineers or host nation agency. As

these storage containers are not part of the hospital's TOE and the wastewater tank trucks and pumping equipment are not standard engineer equipment, this option requires extensive prior planning and coordination.

- e. All AMEDD personnel are required to know how to construct and operate field expedient waste facilities. For the hospital, some engineer support in the form of excavation equipment is almost always required. This requirement will be due, in part, to the inordinate volumes of wastewater generated by the hospital and its associated (kitchen, shower, and laundry) facilities. Engineer support must be coordinated and included in the site preparation planning.
- f. Traditional field expedient methods of wastewater disposal consist of soakage pits, soakage trenches, and/or evaporation beds. The effectiveness of these methods depends on the geological conditions and the climate. While these disposal devices, especially soakage pits, are generally constructed for small volumes of wastewater, with proper design and operation they can be effective for larger volumes. Because these methods result in final disposal, it is necessary to remove grease, particulate matter and other such organic material that could reduce the effectiveness of the process. Guidance on designs and construction of these devices is available in FM 21-10 and FM 21-10-1 and from supporting engineer and preventive medicine personnel.
- g. In arctic environments, or when geological or climatic conditions are to such extreme that soakage or evaporation is not possible, the only alternative may be to collect the wastewater in containers for removal by Army engineer or host nation operators.

### References

- HQ, HSC. (1993). Management of regulated medical waste (HSC Reg 40-35). Fort Sam Houston, TX: Author.
- HQDA. (1986). Preventive medicine specialist (FM 8-250). Washington, DC: Author.
- HQDA. (1988). Field hygiene and sanitation (FM 21-10). Washington, DC: Author.
- HQDA. (1989). Unit field sanitation team (FM 21-10-1). Washington, DC: Author.
- HQDA. (1990). Medical services: Preventive medicine (AR 40-5). Washington, DC: Author.
- HQDA. (1993). Area support medical battalion: Tactics, techniques, and procedures (FM 8-10-24, Appendix B). Washington, DC: Author.
- HQDA. (1994). Employment of the combat support hospital: Tactics, techniques, and procedures (FM 8-10-14). Washington, DC: Author.
- HQDA. (1995). Employment of the field and general hospitals: Tactics, techniques, and procedures (FM 8-10-15; final draft, December 1995). Washington, DC: Author.
- HQDA. (1995). Medical services: Medical logistics policies and procedures (AR 40-61). Washington, DC: Author.
- USACHPPM. (1995). Waste management guidance for AMEDD support for US deployment to Bosnia. APG, MD: USACHPPM, Hazardous and Medical Waste Program.

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## E. Sustainment Functions

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### **8.01: Ensure Adequate Nutrition is Provided for Patients and Staff**

#### **Conditions**

You are given scenarios in which you must make sure that adequate nutrition is provided for patients and staff in your field unit/MTF.

#### **Standards**

Describe (a) the standard rations available to patients in your MTF, (b) the roles of nutrition care personnel and nursing personnel in providing nutritional support for patients in your MTF, and (c) provisions available for adequate nutrition and hydration of soldiers in a deployed or field status in the given scenarios IAW the references.

#### **Enabling Learning Objectives**

#### **Action 1**

**Conditions.** You are given a scenario in which you are providing care for patients in a field MTF and you must understand the standard rations available to them.

**Standards.** Describe standard rations available to patients in the scenario IAW the references.

#### **Description of Action 1.**

1. Rations are defined in FM 8-505 as follows:

- a. Ration - The allowance of food for the subsistence of one person for one day.
- b. *A* Ration - *A* Rations consist of perishable (fresh and/or frozen) and semiperishable food items necessary to prepare the type menus prescribed in Supply Bulletin (SB) 10-260 and SB 10-263.
- c. *B* Ration - *B* Rations consist of approximately 100 semiperishable food items, mainly canned and dehydrated, used for mass feeding where kitchen facilities (except for refrigeration) are available. *B* Rations are identified in SB 10-495.

- d. Meal, Ready-To-Eat (*MRE*) - The *MRE* is a packaged meal designed for issue, either in individual units or in multiples of three for a complete ration. The components are packaged in flexible envelopes.
  - e. Medical B Ration (*MB*) - Consists primarily of foods identified in SB 10-495, plus Medical B Ration unique food items in SB 10-495-1. The additional Medical B Ration unique items are required to meet patient nutritional and consistency requirements.
  - f. *T* Ration - *T* Rations are precooked, thermally processed, shelf-stable products packed in sealed, lightweight metal containers (half-size steam table pans) ready for heating and serving. Depending on the menu item, each tray is designed to feed 12 to 18 soldiers.
2. Nutritional intake of patients must be sufficient to meet increased metabolic demands of illness and injury. The types of standard rations available to patients in a field environment include the following:
- a. Standard *MB* ration diet. The standard *B* Medical ration for the Armed Forces is used in theater. Patients are exempt from theater ration policy and receive three hot *MB* rations per day. *A* rations and *MB* rations are the only accepted patient feeding rations.
    - (1) Standard diets to be used in a TOE facility consist of *MB* diets and *MBL* diets.
    - (2) *MB* diets include regular, high calorie, high protein, and dental soft diets.
    - (3) *MBL* diets are dental liquid, full liquid, and tube feedings.
  - b. Regular and high-calorie/high-protein diets. These diets are used for patients who are able to tolerate a full and complete diet without gastrointestinal problems and patients who have sustained injuries requiring increased nutritional requirements to meet metabolic demands. Examples include multiple trauma patients, burn patients, and patients with severe infections.
    - (1) Regular and high calorie/high protein diets include three meals per day of Standard *B* rations.
    - (2) *A* rations (perishable fresh and/or frozen) food items will be added as refrigeration support is available in theater.

### Action 2

**Conditions.** You are given a scenario with a description of patients in your MTF and available nutrition support personnel.

**Standards.** Describe the role of nutrition care personnel in the given scenario IAW the references.

#### Description of Action 2.

1. Primary role of nutritional care division/clinical dietetics is to ensure that patients receive dietary regimes ordered by physicians. A secondary role is to assess patients' nutritional status and make recommendations about modifications in dietary management of the patient.
2. Nutrition care personnel are responsible for delivery of patient meals to patients in the hospital. Delivery of meals is accomplished by a collaborative effort of nursing personnel and nutrition care personnel. This includes:
  - a. Completing the Modified Diet Record (DA form 2925) listing diets for patients.
  - b. Completing the Ward Diet Roster (DA Form 1829). The ward diet roster is maintained by nursing personnel and should be updated prior to each meal.
3. Patient meal delivery is set by hospital policy. Method of transport of patient meals to the wards requires care to ensure that food is served at proper temperature, is covered, and arrives on the ward in a safe and appealing manner. Various field expedient methods of patient meal delivery are listed in FM 8-505. Feeding systems include:
  - a. Insulated food containers.
  - b. Ward food transporter (Insulated food container hospital ward, IFCHW).

### Action 3

**Conditions.** You are given a scenario in which you are assigned to a medical-surgical ward in a field MTF and must understand nursing considerations and responsibilities associated with feeding isolation patients, trauma patients, post-operative recovery patients, surgical, and medical patients assigned to your ward.

**Standards.** Describe nursing considerations and responsibilities associated with the nutritional care and feeding of patients in the given scenario IAW the references.

#### Description of Action 3.

1. The effects of nutrition and disease on specific patient populations include the following:
  - a. Caloric and nutrient needs are increased in patients who undergo physiological stress associated with illness and injury.
  - b. Prompt nutritional assessment and support is needed to prevent complications of morbidity and mortality. Nurses must be alert to changes in patient status and maintain adequate hydration and nutrition to facilitate faster recovery.
  - c. Specific tables and calculations to figure daily calorie requirements of patients and energy expenditure requirements for specific patient populations are available in FM 8-505.
2. As an adjunct to nursing personnel assets on the ward, ambulatory patients--if able--will go to the dining facility to eat their meals and to help non-ambulatory or more critical patients eat.
3. Isolation patients require special handling of patient trays. Procedures are as follows:
  - a. Isolation trays should be identified by the nutrition care personnel so that personnel can utilize necessary precautions. Nutrition care personnel will not handle contaminated eating ware and waste from isolation patients. (FM 8-505).
  - b. Disposable ware will be used whenever possible. Discarding patient eating ware and food will be IAW unit SOPs and infection control guidelines.
4. Patient late meals and/or emergency feedings: Patients requiring late meals will be served as complete a meal as possible within dietary constraints in keeping with preventive medicine sanitation guidelines.

#### Action 4

**Conditions.** You are given a scenario in which the effects of inadequate nutrition and hydration on soldiers in your unit/ MTF are questioned.

**Standards.** Describe provisions for adequate nutrition and hydration of soldiers in the given scenario IAW the references.

#### Description of Action 4.

1. Theater ration policy is determined by the Theater Commander.
2. The primary purpose of military subsistence is to maintain the health and effectiveness of the soldier. General operational rations include the *MRE*, *B* rations, *T* rations, and *A* rations.
3. Current doctrine states that corps and COMMZ level units are expected to use primarily *B* and *T* rations for the first 90 days of operation (FM 8-505). As theater capabilities mature, *A* rations may be supplemented once support is in place to prevent spoilage of perishable items such as fresh fruits and vegetables.
4. Staff assigned to medical units will be fed according to the service theater ration policy. Meals served are regular diets from the Medical *B* rations.
5. Water requirements for soldiers in the field are dependent upon environmental factors such as heat, cold, or temperate climates. FM 10-52 provides a reference for daily water requirements per soldier. In times of combat, or water shortage, drinking water requirements must not be lessened. Drinking adequate fluids is mandatory and should be stressed.
6. Calculations for water requirements per soldier during deployment are explained in FM 10-52.

#### References

- HQDA. (1989). Army medical field feeding operations (FM 8-505). Washington, DC: Author.
- HQDA. (1990). The Army field feeding system (AR 30-21). Washington, DC: Author.
- HQDA. (1991). Field water supply in theater of operations (FM 10-52). Washington, DC: Author.

## **8.02: Manage Battle Fatigue**

### **Conditions**

You are given scenarios in which you, other personnel assigned to your unit, and/or your patients exhibit signs of battle fatigue and associated conditions.

### **Standards**

Describe appropriate identification, treatment, and prevention of battle fatigue in the given scenarios IAW the references.

**Note.** Recommended handouts to use when training this task are GTA 21-3-4, GTA 21-3-5, and GTA 21-3-6 (see following reference list). They are available from your local US Army Training and Audiovisual Support Center (TASC).

### **Enabling Learning Objectives**

#### **Action 1**

**Conditions.** You are given a scenario in which you and other personnel in your unit/MTF are subjected to combat stress and stressors.

**Standards.** Define combat stress, stressors, battle fatigue, and misconduct stress behavior in the given scenario IAW the references.

#### **Description of Action 1.**

1. Battle fatigue is a broad group of physical, mental, and emotional signs that naturally result from the heavy mental and emotional work of facing danger under difficult conditions. Its symptoms have in common that they -
  - a. Feel unpleasant.
  - b. May interfere with mission performance.
  - c. Improve with reassurance, rest, replenishment of physical needs, and activities which restore confidence.
2. Battle fatigue is the US Army's official, doctrinal term for combat stress behaviors which fit the definition given.

**Note.** The term *battle fatigue* is to be used whether the signs occur in a new soldier or in a veteran after months of combat. It is to be used whether the signs start before shooting starts, during the action, or in a letdown period before further action. It can occur in soldiers, including nursing personnel, who

are not themselves under fire but are performing demanding duties under the threat of danger or serious failure.

3. There are differences among the terms *battle fatigue*, *stressors*, *combat stress*, and *other combat stress behaviors*.
  - a. Stressors are the causes of combat stress. They are events or situations which require a change, create internal conflict, or pose a threat. Combat stressors are any stressors which occur in the context of performing one's combat mission (whether under fire or not).
    - (1) The following physical stressors may contribute to battle fatigue:
      - (a) Environmental - heat, cold, wetness, vibration, noise, hypoxia/insufficient oxygen, fumes, difficult physical work.
      - (b) Physiological - sleep deprivation, dehydration, malnutrition, poor hygiene, illness, injury.
    - (2) The following mental/emotional stressors may contribute to battle fatigue:
      - (a) Cognitive - too little or too much information, sensory overload versus deprivation, ambiguity, uncertainty, isolation, time pressure versus waiting.
      - (b) Emotional - fear and threat of death, injury, failure, loss, boredom produced by inactivity, conflicting motives, interpersonal feelings.
    - (3) A stressor plus the soldier's perception of that stressor causes stress.
  - b. Combat stress is the internal psychological and physiological process within the individual soldier of reacting to and dealing with the combat stressors. Stress depends much on the individual's appraisal of the stressor and its context.
    - (1) Combat stress at any given time is the result of many stressors: Fear of death, fear of failure, other intense painful emotions like grief and guilt, uncertainty, boredom, worries about what is happening back home, and the many physical and mental demands of combat duties.
    - (2) Combat stress is the cause of battle fatigue.
  - c. Combat stress behaviors are the observable behaviors which the soldier shows as the result of the internal stress (either to overcome the stress, to escape it, to make it more tolerable, or to have a side effect of it). Battle fatigue is one group of combat stress behaviors. There are also other combat stress reactions.
    - (1) Positive combat stress reactions include alertness, exceptional strength and endurance, loyalty to comrades, and acts of heroism.

- (2) Negative combat stress reactions include malingering, self-inflicted wounds, committing criminal acts, abusing drugs, going absent without leave, or refusing to obey orders. These negative reactions are not called battle fatigue, although battle fatigue may be present along with them if they really are reactions to combat stress. These negative reactions are called misconduct stress behaviors.
    - (a) The misconduct may or may not interfere with specific combat tasks and may even be done by otherwise excellent soldiers, but it is harmful to discipline, is illegal, and is contrary to the UCMJ.
    - (b) The misconduct stress behaviors can be prevented by good leadership, but once they occur, they require administrative action, specific medical or surgical treatment, and/or punishment. For example, malingerers must be counseled and returned to their units. Soldiers with self-inflicted wounds require line-of-duty investigations which may warrant disciplinary action. If line-of-duty is no, these soldiers may incur all cost associated with their treatment, hospitalization, and recovery. Soldiers who desert or violate the Law of Land Warfare must be punished.
  - (3) Combat stress or good combat performance do not excuse criminal acts. Misconduct stress behaviors must be prevented.
- d. The difficult combat conditions (stressors) which cause battle fatigue may include sleep loss, dehydration, muscular fatigue, and physical stressors such as heat, cold, or noise. However, these are not necessarily the causes.
  - e. Like physical fatigue, battle fatigue can develop at either a slow or fast rate. Its speed of onset depends on the intensity and duration of the stress and on the soldier's prior training, experience, and fitness.
  - f. Battle fatigue usually improves when a soldier can rest and replenish himself with food, water, and sleep. It is just as important to restore his self-confidence.
  - g. Remember that battle fatigue is a simple, common sense name for a natural, common condition which is not a medical or psychiatric illness.

**Note.** Experience from WWI and WWII shows that soldiers tend to develop signs that are harder to manage if dramatic terms like "psych casualty" or "battle shock" are used. Fatigue is a better word than exhaustion. It applies to the mild as well as to the heavy cases and implies that the condition improves quickly.

- 4. The terms *stress fatigue* or *conflict fatigue* can be used for the same signs occurring under stressful conditions where no actual combat is involved. For example, stress fatigue is common among officers and NCOs at the National Training Center.

## Action 2

**Conditions.** You are given a scenario in which you, your patients, and/or personnel assigned to your unit exhibit signs of battle fatigue.

**Standards.** Describe normal, common signs and warning signs of battle fatigue.

### Description of Action 2.

1. Following are normal, common signs of battle fatigue:

a. Normal, common physical signs include the following:

- (1) Tension: Aches, pains; tremble, fidget, fumble things.
- (2) Jumpiness: Startle at sudden sounds or movement.
- (3) Cold sweat; dry mouth; pale skin; eyes hard to focus.
- (4) Pounding heart; may feel dizzy or light-headed.
- (5) Feel out of breath; may breathe too much until fingers and toes start to tingle, cramp and go numb.
- (6) Upset stomach; may throw up.
- (7) Diarrhea or constipation; frequent urination.
- (8) Emptying bowels and bladder at instant of danger.
- (9) Fatigue: Feel tired, drained; takes an effort to move.
- (10) Distant, haunted ("1000 yard") stare.

b. Normal, common mental and emotional signs include the following:

- (1) Anxiety: Keyed up, worrying, expecting the worst.
- (2) Irritability: Swearing, complaining, easily bothered.
- (3) Difficulty paying attention, remembering details.
- (4) Difficulty thinking, speaking, communicating.
- (5) Trouble sleeping; awakened by bad dreams.
- (6) Grief: Tearful, crying for dead or wounded buddies.
- (7) Feeling badly about mistakes or what had to be done.
- (8) Anger: Feeling let down by leaders or others in unit.
- (9) Beginning to lose confidence in self and unit.
- (10) Many soldiers have these signs, yet still fight well and do all their essential duties.

2. The following are facts about normal, common signs of battle fatigue:

a. Most of the physical signs are the result of having an increased amount of adrenaline in the bloodstream. These physical signs are likely to worsen when a person cannot be physically active or when he stays keyed up for a long time without resting.

- b. The mental signs are natural in situations where high stress, fear, or fatigue temporarily overload the brain's ability to process information. The emotional signs are likely to occur because bad things do happen in combat to cause normal grief, guilt, resentment, and doubt.
- c. Most soldiers have some of these signs some of the time (before, during, and after combat or danger).
- d. Some soldiers have many of these signs often, yet they still fight well and perform all essential duties.
- e. All soldiers, especially leaders, need to know that these signs are normal and common so they will not worry about them too much.
- f. Key point: These signs are so normal that you should look closer at soldiers who never show any. Maybe they are just controlling their stress and fear exceedingly well. But maybe they do not realize the danger. Or, maybe the absence of the normal response is a warning sign of more serious battle fatigue.

3. Following are "more serious" (warning) signs of battle fatigue:

- a. More serious physical signs include the following:
  - (1) Can't keep still; constantly moving around.
  - (2) Flinching or ducking at most sudden sounds and movement.
  - (3) Shaking (of arms or whole body); cowering in terror.
  - (4) Part of body won't work right, with no physical reason:
    - Can't use hand, or arm, or legs.
    - Can't see (or hear, or feel), partially or at all.
  - (5) Freezing under fire, or prolonged, total immobility.
  - (6) Physical exhaustion; slowed down, just stands or sits.
  - (7) Vacant stare, "spaced out"; staggers, sways when stands.
- b. More serious mental and emotional signs include the following:
  - (1) Rapid talking; constantly making suggestions.
  - (2) Arguing, starting fights; deliberately reckless action.
  - (3) Inattention to self-care, hygiene; indifference to danger.
  - (4) Memory loss:
    - For orders; for military skills; for a bad event;
    - For time, place, what's going on; or for everything.
  - (5) Severe stuttering, mumbling, can't speak at all.
  - (6) Afraid to fall asleep for fear of terror dreams, danger; unable to stay asleep even in a safe area.
  - (7) Seeing or hearing things which aren't really there.
  - (8) Rapid emotional shifts; crying spells; wishing was dead.

- (9) Social withdrawal; silent or sulking; prolonged sadness.
- (10) Apathetic; no interest in food or anything else.
- (11) "Hysterical" outburst, frantic or strange behavior.
- (12) Panic running under fire.

4. The following are facts about warning signs of battle fatigue:

- a. Warning means that these are signs which deserve special attention and leadership action.
- b. Warning signs do not necessarily mean that the soldier needs to be relieved of duty or be evacuated as a casualty. Immediate action by leaders, buddies, or the soldiers themselves may be all that is required.
- c. Any of the normal, common signs become warnings signs if they interfere with essential performance even after the soldier's buddies or leaders have taken action to help them.
- d. Normal, common signs should be considered warning signs if they do not improve when the soldier gets a good chance to rest. However, these signs may not go away completely while the war continues. The soldier may have to learn to live with some of them. Some of the signs may even continue for a time after the soldier's return from combat to his home.
- e. The signs must be considered in relation to a soldier's usual way of reacting. Take them more seriously if they come as a big change from how that soldier usually reacts to danger or interacts with other people.
- f. Some warning signs differ from the normal, common signs only in degree or the situation. For example:
  - (1) Fidgeting and trembling are normal and common, while constantly moving around or obvious shaking are warning signs.
  - (2) Trembling of the hands before action is normal and common, but the same trembling while performing a critical combat task is a warning sign if it may result in mission failure.
- g. Some signs are always warning signs in the sense of requiring some immediate leader action. They may be a sign of dangerous physical or mental illness. For example:
  - (1) Seeing or hearing things which aren't there is always a warning sign. It may endanger the mission or be a sign of serious illness.
  - (2) However, seeing things which are not there does occur often in otherwise perfectly normal people when they go a long time without sleep. They recover when they get sleep and may not necessarily have to leave the unit or get medical evaluation.

### Action 3

**Conditions.** You are given a scenario in which your patients and personnel assigned to your unit exhibit signs of battle fatigue.

**Standards.** Identify the battle fatigue classification for each soldier, explain your rationale for your classifications, and explain the type of treatment needed in the given scenario IAW the references.

#### Description of Action 3.

1. One of the most important lessons learned from previous wars is the need for timely and appropriate handling of battle-fatigued soldiers. Treatment is based on the following principles of proximity, immediacy, and expectancy, known by the PIE acronym:
  - a. These soldiers should be seen as close to the battlefield as possible (proximity).
  - b. They should be treated as quickly as possible (immediacy) and should be provided with rest and nutrition.
  - c. They should be told that their symptoms are normal in combat and that they will recover (expectancy).
2. Cases of battle fatigue are classified according to where they can be managed.

**Note.** The labels *duty*, *rest*, and *heavy* should be thought of as nothing more than "tickets" which say where the soldier should go at this time. They are temporary triage categories (like immediate, minimal, delayed, and expectant in surgical triage). The following criteria are used to decide where the soldier can be treated.

- a. **Duty.** The soldier remains in the small unit (section or platoon) to rest and be restored to full duty. Duty applies to soldiers who -
  - (1) Show normal, common signs of battle fatigue, feel uncomfortable, but are 100% effective.
  - (2) Show warning signs and may be partially or even completely ineffective, but are not an unacceptable risk or burden to the unit in the tactical situation.
  - (3) Do not need urgent medical evaluation.
- b. **Rest.** The soldier cannot remain in the small unit and must be sent to another supporting unit for temporary rest and replenishment, but not necessarily to a medical unit. Rest applies to soldiers who are in situations in which -
  - (1) They are too much of a risk or burden to stay with their own unit at this time, given its tactical mission.
  - (2) The soldiers' own units cannot provide a sufficiently safe, stable environment for rest and replenishment at this time.

- (3) The soldiers are not too disruptive or potentially dangerous for a unit with a less demanding mission at this time.
- (4) They do not need urgent medical evaluation to rule out some possible serious physical cause or illness for the signs they are showing.

**Note.** Whether a case of battle fatigue is called *duty* or *rest* depends more on the tactical situation, mission, and resources of the small unit than it does on the signs the soldier is showing.

- c. **Heavy.** The soldier must be sent to a physician, physician assistant or mental health officer for evaluation. The soldier has more serious warning signs that fit in one or both of the categories below -
  - (1) The soldier is too burdensome, disruptive, or possibly dangerous to keep in the small unit or in any available nonmedical support unit at this time.
  - (2) The soldier's symptoms could be due to a physical cause which may need urgent medical-surgical treatment (e.g., head or spine injury, drug abuse).

**Note.** Once the soldier reaches the medical system, the classification *heavy* is subdivided into *refer* (meaning send to the next echelon medical facility for evaluation) and *hold* (meaning hold for treatment at this medical facility).

- 3. There is no easy rule for deciding whether a warning sign makes the soldier a case of *duty*, *rest*, or *heavy* battle fatigue. That will require judgment based on what is known about the individual soldier: What has happened to the soldier; how the soldier responds to helping actions; what is likely to happen to the unit next; and what resources are available to the unit. Any warning sign that can be listed in a few words may be *duty* battle fatigue in one case, be *rest* in another, and be *heavy* in a third case.
- 4. Signs which would usually cause the case to be sorted as *heavy* include the following:
  - a. Dangerous, threatening behavior which is not just a disciplinary problem.
  - b. Hallucinations and delusions not explained by sleep loss.
  - c. Serious memory loss.
  - d. Extreme pain.
  - e. Loss of a major physical function, such as vision or the ability to move an arm.
  - f. Complete unresponsiveness; not moving or answering at all.

**Note.** Any of these cases might still be classified as *rest* or even as *duty* if the signs occur in response to extreme stress and clear up quickly. Also, the *heavy* classification does not necessarily mean that a soldier is less likely to recover or will take longer to recover than cases classified as *duty* or *rest*.

5. Refer to the recommended handouts for further information regarding actions for battle-fatigued soldiers:

- a. What soldiers should do for self and buddy when showing signs of battle fatigue is outlined in GTA 21-3-4.
- b. Leader actions for normal, common and warning signs of battle fatigue are outlined in GTA 21-3-5.
- c. Leader actions for *duty*, *rest*, and *heavy* battle fatigue are outlined in GTA 21-3-6.

**Note.** *Duty*, *rest*, and *heavy* originally were classified as mild, moderate, and severe in the 1986 version of GTA 21-3-6. They have been changed to *duty*, *rest*, and *heavy* in the 1991 updates of these GTAs to conform with FM 22-51.

6. The following are key points regarding leaders' actions for *duty* and *rest* battle-fatigued soldiers:

- a. The first sergeant or NCOIC has to take the soldiers and find them a safer, quieter place to rest and work for a day or two. See GTA 21-3-5 regarding instructions for the leader who receives the soldiers temporarily.
- b. If the soldier's small unit cannot wait for the first sergeant/NCOIC to take the soldier, it may be necessary to evacuate to the supporting medical element. If so, every effort should be made there to remove the soldier from medical channels to a nonmedical unit for further rest, replenishment, and reassurance.
- c. A first sergeant/NCOIC who cannot find a suitable support unit can try to arrange a place to sleep at a medical unit which has empty cots. This alternative is not preferred, and the soldier must understand he is not a patient, just a tired soldier.
- d. The soldier must remain accounted for and not get lost in the shuffle. There must be a positive plan to return the soldier to the original unit in a short time, and the soldier must know this.
- e. Every reasonable effort should be made to maintain personal contact between the soldier and the original unit.

7. Leader actions for *heavy* battle-fatigued soldiers are the same as for the *rest* battle-fatigued except that *heavy* battle-fatigued soldiers are evacuated medically, as soon as possible, to be examined by a physician or physician assistant.

- a. They may be successfully treated and released within hours (as *duty* or *rest* battle fatigue), or may be held there for rest and treatment for a day or two, or may be evacuated further to the rear. What happens depends on their signs and the medical unit's situation.

- b. If treated close to their units, 50 to 85% (average: 75%) of *heavy* battle fatigue casualties return to duty within 1 to 3 days. About 15 to 20% more may return to other duty (usually in other units) in 1 to 2 weeks. Only 5 to 10% have to be evacuated home, and they usually have other problems besides battle fatigue.
  - c. However, if evacuated too far too fast, few battle-fatigued soldiers return to duty. Many may remain permanently disabled.
8. Recovered battle-fatigued soldiers who return to their units and are welcomed there do not have a higher rate of battle fatigue than other soldiers. They are less likely to break again (or to be killed or wounded) than is a new replacement who is a stranger in the unit.
9. A good soldier will be good again. A new soldier who becomes a battle fatigue casualty deserves another chance. Being new to combat and a stranger in the unit are two high-stress/high-risk factors. These factors have been partially overcome if that soldier returns to the same unit and is welcomed there. However, someone who has always been a poor soldier is not going to be made into a good one simply by treatment for battle fatigue. The soldier may need to be reassigned to some other job or unit (or be discharged as unsuitable).

#### Action 4

**Conditions.** You are given a scenario in which you and other personnel in your unit/MTF are subjected to combat stress and stressors.

**Standards.** Describe principles of preventing battle fatigue among personnel in your unit/MTF in the given scenario IAW the references.

#### Description of Action 4.

1. While the average ratio of battle fatigue casualties to wounded in action is one for every three to five, elite units consistently have fewer than one for ten wounded. We cannot prevent battle fatigue in highly stressful combat; however, we can prevent battle fatigue casualties who require treatment in the medical system.
2. Refer to GTA 21-3-6 for an overview of factors that increase battle fatigue casualties and leaders' actions to prevent them.
3. The following are key principles for reducing the stress of combat and preventing battle fatigue casualties:

- a. Encourage unit cohesion by integrating new replacements quickly, assigning buddies, and using other team-building techniques. Unit cohesion is the personal trust and loyalty of soldiers who have worked together to overcome hardship and danger to achieve a common objective.
- b. Stabilize the home front by helping soldiers resolve their home front problems. An Israeli study found that having uncertainties at home was the strongest factor which distinguished soldiers who became stress casualties from those who were decorated for valor. Unit cohesion was the second strongest.
- c. Instill unit pride by honoring historical examples of initiative, endurance and resilience, of overcoming heavy odds, and of self-sacrifice leading to triumph. This is needed to give direction and hope to the cohesive unit so that it does not become preoccupied solely with the survival and comfort of its members.
- d. Assure physical fitness. This must enhance muscle strength and agility as well as endurance through a regular training program. Not being physically fit almost guarantees battle fatigue when the going gets rough.
- e. Conduct tough, realistic training that is as much like the combat mission and environment as possible (sights, sounds, pace, confusion, fatigue, discomfort, and feedback). This includes training for nursing personnel in clinical skills and functions that are part of their patient care role in a deployed or field status. Soldiers' first exposure to combat, to enemy weapons and tactics, and to strange, hostile climates produces battle fatigue.
- f. Practice casualty care and evacuation routinely. Everyone must know lifesaving techniques for self and buddy. Talk about the possible loss of leaders and comrades. Prepare junior leaders (and yourself) to take over. This way soldiers know that they can receive immediate care and the chain of command will not break.
- g. Plan and practice sleep discipline. Plan ahead to make sure all soldiers get enough sleep, especially leaders and those with critical tasks. Sleep discipline means reviewing sleep as a resource to allocate to soldiers just like water, food, ammunition and fuel.

### References

- HQDA. (1986). Battle fatigue: Company leader actions & prevention (GTA 21-3-6). Washington, DC: Author.
- HQDA. (1986). Battle fatigue: "More serious" signs; Leader actions (GTA 21-3-5). Washington, DC: Author.
- HQDA. (1986). Battle fatigue: "Normal, common" signs; What to do for self & buddy (GTA 21-3-4). Washington, DC: Author.
- HQDA. (1991). Health service support in a theater of operations (FM 8-10). Washington, DC: Author.
- HQDA. (1994). Combat stress control in a theater of operations: Tactics, techniques, and procedures (FM 8-51). Washington, DC: Author.
- HQDA. (1994). Leaders' manual for combat stress control (FM 22-51). Washington, DC: Author.
- Zajtchuk, R. (Ed. in Chief) & Jones, F. D., Sparacino, L. R., Wilcox, V. L., Rothberg, J. M., & Stokes, J. W. (Specialty Eds.). (1995). Textbook of military medicine: Part I. Vol. 4. War psychiatry. Falls Church, VA: United States Army, Office of The Surgeon General.

## **8.03: Develop Staffing Plans for Routine Medical Operations**

### **Conditions**

You are given scenarios in which you must staff your hospital, section, or ward with available nursing personnel during routine operations in your field MTF.

### **Standards**

Develop staffing plans for routine operations in your field MTF, demonstrating an understanding of expanded roles of nursing personnel in a TOE environment in the given scenario IAW the references.

### **Enabling Learning Objectives**

#### **Action 1**

**Conditions.** You are given a scenario in which you must staff your hospital, section, or ward with available nursing personnel during routine operations in your field MTF. You are responsible for staffing with nursing personnel functioning in the following AOCs\MOSSs: (a) 91B, (b) 91C, (c) 91D, (d) 66H, (e) 66E, and\or (f) 66F.

**Standards.** Develop a staffing plan for routine operations in your hospital, section, or ward IAW the expanded roles of nursing personnel in the given scenario IAW the references and your unit SOPs.

#### **Description of Action 1.**

1. In the active component (AC) of the AMEDD, nursing personnel in a TOE hospital are assigned to the unit as (a) US Army Forces Command (FORSCOM) personnel and (b) AMEDD professional fillers.
  - a. FORSCOM assigned nurses are Army Nurse Corps Officers assigned to a FORSCOM TOE unit, filling required positions in the TOE, but working at the MEDCOM MTF under a MEDCOM-FORSCOM Memorandum of Understanding.
  - b. The AMEDD Professional Filler System (PROFIS) designates qualified Active Army AMEDD personnel serving in TDA units to fill FORSCOM early deploying modified table of organization and equipment (MTOE) units, US Army Pacific (USARPAC), US Army Europe and Seventh Army (USAREUR), and Eighth US Army (EUSA) forward deployed units upon execution of an approved Joint Chiefs of Staff Operation Plan (OPLAN) or upon execution of a no-plan contingency operation. The objective of the PROFIS is to resource MTOE units to their required level of organization of identified AMEDD personnel, in accordance with the Army Mobilization, Operations, Planning and Execution System (AMOPES) (AR 601-142).

- c. MTOE units compare their total MTOE requirements against their authorizations to determine PROFIS requirements. Any AMEDD officer requirement which is not authorized, or which is authorized but not normally staffed during peacetime becomes a PROFIS requirement. This includes the enlisted soldier (Career Management Field (CMF) 91) requirements of the selected FORSCOM and Eighth US Army (EUSA) units only.
  - d. The US Army Medical Command (MEDCOM) tasks selected subordinate MEDCOM units to fill valid TOE requirements, but not authorized positions. When TOE units need PROFIS fillers to train, they request their fillers through FORSCOM to MEDCOM with usually horizontal coordination between the TOE unit and the TDA MTF, which is frequently--but not always--on the same installation.
2. In the reserve components (RC) of the AMEDD, nursing personnel are actually assigned to all of their required TOE positions. Upon mobilization, any nursing position that is unfilled is cross-leveled by US Army Reserve Command (USARC).
3. The roles of nursing personnel are as follows:
- a. **91B - Medical Specialist (CMF 91)** provides emergency and routine out-patient and in-patient medical care. Duties include treating battle and nonbattle casualties in wartime and peacetime environments. Duties for MOS 91B at each skill level are as follows:
    - (1) 91B10. Assists with (a) in-patient care under supervision of a physician or nurse and (b) out-patient care (e.g., in a Troop Medical Clinic) often under supervision of a physician assistant. In wartime, the 91B10 becomes a combat medic or is assigned to perform triage and emergency medical treatment for battlefield casualties (usually at the BAS). Additional duties include erecting and breaking down the treatment area, performing patient care, initiating patient records, ensuring patients are seen or treated, logging care in the daily disposition log, and operating and maintaining assigned vehicles, tactical radios, and power generation equipment.
    - (2) 91B20. Assists with out-patient and in-patient care and supervises field and clinical medical facilities under supervision of a physician, nurse, or physician assistant. In wartime, administers emergency and routine medical care to battle and non-battle casualties. Assists the treatment squad NCO (91B30) with supervisory duties of the treatment squad and emergency medical treatment (EMT).
    - (3) 91B30. Usually an NCO. Supervises activities of field, clinical, and mobile treatment facilities. Assists the physician or physician assistant in the clinical facility. Wartime duties include performing triage, assisting with emergency medical treatment for trauma patients, and performing NBC procedures. Additional duties include supervising and training 91B10s, assisting in the establishment of operations of Echelon I and II MTFs, maintaining patient accountability/casualty reporting system, conducting training in first aid and

emergency medical procedures to assigned personnel and combat lifesavers, and performing preventive medicine functions for the unit.

b. **91C - Practical Nurse (CMF 91)** supervises or performs preventive, therapeutic, and emergency nursing care procedures under the supervision of a physician, nurse, or NCO. Other duties for MOS 91C skill levels are as follows:

- (1) 91C20. Also assists the wardmaster with duties and provides technical guidance and mentorship to junior enlisted personnel.
- (2) 91C30 (E-6). Functions as wardmaster. In wartime, provides preventive, therapeutic, and emergency care to injured, sick, or wounded patients placed in patient holding areas (would be assigned to a patient holding squad). Provides technical guidance and trains and supervises assigned personnel. Also plans and executes the establishment, disestablishment, moving, and operations of the MTF or patient holding facility. Orders and maintains accountability for supplies, equipment, and vehicles assigned to the unit.

c. **91D - Operating Room Specialist (CMF 91)**, under direction of an operating room nurse, participates in preparing the patient and environment for surgical procedures, provides assistance during surgery, prepares and maintains sterile supplies and equipment for the MTF, manages CMS, and assists in the management of the Operating Room. Duties for MOS 91D skill levels are as follows:

- (1) 91D10. Under close supervision participates in preparing patient and environment for surgical procedures and provides assistance during surgery. Prepares and maintains sterile supplies for MTF.
- (2) 91D20. Participates in preparing patient and environment for surgical procedures, provides assistance during surgery, prepares and maintains sterile supplies and equipment.
- (3) 91D30. Manages CMS or assists with the management of the Operating Room.

d. **66H Medical Surgical Nurse.**

- (1) In a TDA, major duties are to plan and implement professional nursing care of a generalized, specialized and technical nature in the care and treatment of medical-surgical patients. Also supervises paraprofessional staff.
- (2) In a TOE, medical-surgical nursing practice incorporates the use of cognitive, clinical, and managerial skills to effectively implement safe patient care and integrate TDA nursing personnel who are not trained to manage patients seen in wartime scenarios. Conditions are austere, equipment is different, and types of patients seen in the treatment facility have higher acuity and combat injuries (DMSB, 1994). In a deployed or field status, medical-

surgical nurses may function as triage nurses when a surgeon is not available or when mascal conditions dictate. Usually assigned to echelons above division (EAD) MTFs. Nurses from other specialties may be needed to augment medical surgical wards--e.g., psychiatric nurses may be assigned to work in other Intermediate Care or Minimal Care Wards when not required to work in their specialty area (DMSB, 1994).

e. **66E - Operating Room Nurse.**

- (1) In a TDA, performs specialized professional duties in all phases of the operative process for patients undergoing all types of surgery and provides safe supplies and equipment for operative services. Also supervises 91Ds and performs circulating duties.
- (2) In the active component, the CSH, FH, and GH have at least one FORSCOM-authorized 66E to fill a required position. The remainder of the required positions are filled by PROFIS upon deployment. THE FORSCOM-authorized 66E then assists in orientation of PROFIS if they have not had sufficient previous training. A 66E position is also found in the FST.

f. **66F-Nurse Anesthetist.**

- (1) Performs professional nursing duties of a specialized nature in the care of patients requiring general or regional anesthesia, respiratory care, cardiopulmonary resuscitation, and\or fluid therapy.
- (2) In a TOE, the 66F assists with PROFIS personnel orientation to the DEPMEDS anesthesia equipment. A 66F position is also found in the FST.

4. When developing your staffing plan, consider the following general description of selected wards in a DEPMEDS treatment facility (as described in *DEPMEDS Administrative Procedures and Clinical and Support Guidelines*):

- a. **Intensive Care Unit (ICU):** Manages surgical or medical patients whose physiological status is so disrupted that they require immediate and continuous medical and/or nursing care. The care will be provided by specially trained personnel with the clinical and managerial skills necessary to deliver safe nursing care to patients with complex nursing and medical problems. Noninvasive physiological monitoring and life support systems are standard items used in this setting. Invasive augmentation sets may be available. An ICU may be designated as a postoperative recovery area.
- b. **Intermediate Care Ward (ICW):** Manages surgical or medical patients whose physiological and psychological status is such that they require observation for the presence of real or potential life threatening disease/injury. The acuity of care may range from those requiring constant observation to those patients able to ambulate and assume beginning responsibility for their care.

The level of care and acuity of these patients may fluctuate depending on the intensity of conflict. Although not routine, ICW patients may require monitoring devices and ventilator support.

- c. **Minimal Care Ward (MCW):** Manages surgical or medical patients who are partially self-sufficient and are usually ambulatory. Some may require limited therapeutic and diagnostic services and are in the final stages of recovery. Focus of nursing management is on an aggressive therapeutic environment which enhances recovery. Complexity of care includes administering of oral medications and treatments which cannot be done by patients and may also include providing instruction in self-care and post-hospitalization health maintenance. This treatment may include therapy and reconditioning for return to duty patients.

#### References

- DMSB. (1994). DEPMEDS administrative procedures and clinical and support guidelines (3rd ed. draft). Fort Detrick, MD: Author.
- HQDA. (1991). Health service support in a theater of operations (FM 8-10). Washington, DC: Author.
- HQDA. (1993). Area support medical battalion: Tactics, techniques, and procedures (FM 8-10-24). Washington, DC: Author.
- HQDA. (1994). Military occupational classification and structure: Update 12-5. Washington, DC: Author.
- HQDA. (1995). Army medical department professional filler system (AR 601-142). Washington, DC: Author.
- HQDA. (1995). Medical Services: Commander's guide to combat health support (DA PAM 40-19). Washington, DC: Author.

## **8.04: Develop Staffing and Patient Flow Plans For a Mass Casualty Situation**

### **Conditions**

You are given a list of available medical personnel and descriptions of arriving casualties in a mass casualty situation and are asked to develop staffing and patient flow plans.

### **Standards**

Develop staffing and patient flow plans in the given scenario IAW the references.

### **Enabling Learning Objectives**

#### **Action 1**

**Conditions.** You are given a mass casualty scenario in a CSH with a specified number of available medical personnel and descriptions of the arriving casualties. You must describe staffing and patient flow plans for the scenario,

**Standards.** Describe staffing and patient flow plans (to include how and where you would use your nursing assets) in the given scenario IAW the references. The plans must demonstrate an understanding of triage categories and movement of patients throughout the MTF.

#### **Description of Action 1.**

1. The mission of a CSH is to provide hospitalization for up to 296 patients. The hospital has 8 wards, providing intensive nursing care for up to 96 patients, 7 wards providing intermediate care for 140 patients, one neuropsychiatric (NP) ward for up to 20 patients, and 2 minimal care wards for up to 40 patients (FM 8-10-14).
2. A mass casualty situation for the CSH is defined as the actual or anticipated arrival of numbers or types of casualties that exceed the organization's existing resources to treat under normal operating status.
  - a. The term "mass casualties" means that a large number of casualties has been produced simultaneously or within a relatively short period of time and that the number of patients requiring medical care greatly exceeds the medical capability to provide individualized treatment and evacuation. At the same time the large number of casualties is produced, there may be disruptions in the supply, communication, and transportation systems. In other words, a great disparity exists between the number of casualties requiring care and the medical resources (personnel, facilities, equipment, supplies, evacuation means, and time) available to provide that care.

- b. Actually, a mass casualty situation is present when one field medic is confronted with two critically injured casualties simultaneously. An inability to provide these patients the traditional level of emergency medical treatment exists for a period of time. Thus, triage becomes the identifying feature of a mass casualty situation.
  - c. Note that no uncommitted medical units are in a theater of operations. Evacuation means for casualties also are limited. Therefore, when casualties are produced in numbers exceeding available medical resources, medical units within the theater must be prepared to alter the standards and scope of medical treatment which they ordinarily provide. These alterations in situations of medical disparity must be in compliance with the objective to provide the greatest good for the greatest number of casualties.
3. Consider the following categories of casualties who may arrive at your facility (DMSB, 1994):
- a. **Wounded in Action (WIA).** Category for casualties generated as a result of hostile action.
  - b. **Battle Fatigue Casualties.** Category for casualties who due to the direct or indirect result of battle have a varying degree of performance degradation resulting from psychomotor stress or fatigue.
  - c. **Disease and Nonbattle Injuries (DNBI).** Category for casualties with disease and/or injuries from events not directly related to the battlefield, but related to individually-determined and/or endemic agents. This category includes casualties with environmental injuries whose numbers depend on the acclimatization, readiness, and fitness of the troops and on the climactic conditions. This category also includes casualties with trauma secondary to accidental or self-inflicted injury.
  - d. **Civilian/Non-Combatants.** Other casualties who may arrive at your facility as a result of combat injuries.
4. "Triage" or "sorting" of mass casualties means the evaluation and categorization of casualties for treatment and evacuation to facilitate the intelligent use of available resources and thus ensure the greatest good for the greatest number of casualties. Life takes precedence over limb, and functional repair over cosmetic concern.
- a. Personnel must remember that triage is based on the principle of accomplishing the greatest good for the greatest number of wounded and injured in the special circumstances of warfare at a particular time. Every effort should be made to make sure that existing resources are expended upon the maximum number of salvageable soldiers. All resources cannot be tied up with casualties who have multiple life-threatening wounds and a poor prognosis. Because these casualties require hours of surgeons' time and maximum operating room resources, they could divert care from other casualties whose injuries are less serious and more rapidly treatable.

- b. Although the nature of medical management changes from "worst come first" to "the greatest good for the greatest number," at no time is the abandonment of a single casualty contemplated. On the contrary, categorization of treatment scope during the mass casualty situation is based upon clinically sound criteria as to what can be done on a positive basis to save the lives of as many casualties as the medical means permit.
  - c. Moreover, there must be frequent reassessment and reassigning of triage priorities as conditions change. As each casualty moves from one area of treatment to another, his condition is continually evaluated to determine whether a change in his category of treatment emphasis is warranted. When a disparity no longer exists between the number of casualties and the available medical resources, routine treatment emphasis will govern once again.
5. Following are four general treatment categories into which casualties are sorted during triage:
- a. **Immediate:** This category has the highest priority for treatment. It is the category for casualties whose conditions demand immediate treatment to save life or limb. These casualties present with severe, life-threatening wounds requiring immediate intervention with procedures that generally are short in duration and economical in terms of medical resources. These casualties have a high likelihood of survival with immediate treatment. Depending on the situation, examples of casualties in this category may include those with anaphylaxis, respiratory emergencies (sucking chest wounds, pneumothorax, airway obstruction), unstable abdominal wounds, uncontrolled bleeding, unresponsiveness to fluid resuscitation, incomplete amputations, or femur fractures.
  - b. **Delayed:** Category for the casualty whose condition is such that, with the application of modest emergency procedures, the possibility of morbidity or mortality increases very little by delaying major definitive procedures until they can be performed under more ideal circumstances. These casualties can tolerate delay prior to operative intervention without unduly compromising the likelihood of a successful outcome. When medical resources are overwhelmed, these casualties are held until immediate casualties are cared for. Depending on the situation, examples of casualties in this category may include those with maxillofacial injuries without airway compromise or upper extremity fractures.
  - c. **Minimal:** Category for the casualty whose condition is such that simple procedures will suffice and enable him to be returned to some form of duty. Follow-up treatment may be needed after the disparity phase of the mass casualty is terminated. Many of these casualties can be treated by self-aid or buddy-aid. Often combat stress patients are sorted into this category. These casualties must be rapidly directed away from the triage area to an uncongested area where first aid and non-specialty medical personnel are available.
  - d. **Expectant:** Category for the casualty whose injuries are so massive that the probability of his survival is minimal, even if the total medical resources were to be concentrated on him. Only complicated, resource-intensive, prolonged treatment would have any chance of improving the life expectancy of casualties in this category. The objective to provide the greatest good for the

greatest number during the period of medical disparity dictates that medical personnel (a) manage casualties in this category with an attitude of alertness (expectancy) to changes in their condition and (b) provide them with symptomatic and supportive care (e.g., pain medications and airway management) until such time as the medical workload permits a more intensive effort in their behalf. These casualties should not be abandoned, but they should be separated from immediate treatment areas.

6. Sorting is accomplished by the medical personnel (triage officers) best qualified to make sound clinical judgements promptly. A Triage Officer may be a physician, nurse, dentist, physician assistant, or any other nursing personnel, depending on the situation, location, number of medical personnel assigned, etc. A Triage Officer does not perform medical care when assessing a casualty. He assesses all casualties initially for stability of vital functions and assigns an initial priority for treatment or triage category.
  - a. It is important to understand that being triaged delayed or minimal does not mean that absolutely nothing is being done, or that being triaged immediate means there is an open bed. For example, frequently there are more immediate patients than there are resuscitation stations, and "triage within triage" has to occur. IVs, some medications, airways, irrigating burns and eyes, etc. are often started in the "triage" area on patients waiting for an open station. Delayed and minimal areas are staffed with some level of health care personnel who also begin what care and treatment they can while waiting for a bed.
  - b. While making triage decisions, a Triage Officer must keep in mind the medical facility's availability of resources and must guard against making decisions which overwhelm the capabilities for providing appropriate treatment. Examples of some of the factors a Triage Officer must keep in mind are as follows:
    - (1) Availability of surgeons, perioperative nursing support, and anesthesia support.
    - (2) Availability of blood or blood products.
    - (3) Availability of respiratory therapy support for the postoperative patient.
    - (4) Availability of evacuation methods, either surface evacuation or rapid movement by air.
    - (5) Exposure of the medical facility to a tactical situation and likelihood of the hospital coming under fire.
    - (6) Potential decrement in overall unit efficiency secondary to fatigue.
7. Casualties can be color-coded into a triage category by the Triage Officer to assist medical personnel in quickly identifying a casualty's priority for medical treatment.
  - a. The US Military Color Codes are:
    - (1) Red - Immediate
    - (2) Yellow - Delayed
    - (3) Green - Minimal
    - (4) Blue - Expectant

- b. The **International Color Code** (countries outside the US) used for triage is the same except for the color black, which is used to identify those casualties in the expectant category.
- 8. Movement of patients throughout the facility should be planned in advance of a mass casualty situation IAW hospital policy. Considerations for staff planning and smooth patient flow should include the following:
  - a. **Triage area:** Adequate space is important. Triage officers in this setting include a general surgeon, PA, and/or nurse. The goal is movement of patients through triage areas as quickly as possible. Triage areas should be as close to EMT/OR and immediate treatment areas as possible. To ease congestion, minimal and ambulatory patients should be further evaluated in a separate designated area (i.e., minimal care wards or clinics). Dead casualties should not be introduced into the triage area, but sent to a holding area or a morgue for disposition. The triage team is composed of a general surgeon, EMT medics, litter teams, and an NCO who facilitates patient movement.
  - b. **Emergency Treatment area (EMT):** Handles urgent patients or those who require immediate resuscitation. These casualties are then moved to the OR or to the ICU for stabilization of their injuries. Staffing considerations are: Trauma teams will be needed for each casualty or bed in the EMT, to include a physician, EMT medic, and nurse. Litter teams should be available to move patients to the OR, lab, X-ray, ICU, or pre-op area. During the initial influx of patients, nurse anesthetists may assist with fluid resuscitation, airway management, ventilatory support, and other critical interventions until they are needed in the OR.
  - c. **Intensive Care Units (ICUs):** ICUs will also function as post-op recovery areas. Therefore, it generally works better for urgent casualties to go to a designated pre-op area (not the ICU) for stabilization until they are able to go to the OR. Otherwise, ICUs can become unmanageable and patients waiting for the OR can get overlooked. Staffing considerations are to have the nurses, 91Bs, and 91Cs handle patients being admitted to the wards as needed.
  - d. **Intermediate Care Wards (ICWs):** Delayed casualties will go to ICWs. Often these are patients who are waiting for surgery and do not require resuscitation or stabilization. Staffing considerations are to use nursing personnel who are able to handle pre-op and post-op patients. Staffing mixture should include nurses, 91Bs, and 91Cs.
  - e. **Operating Room (OR):** Surgical capabilities in a CSH are based on 8 operating tables for a surgical capacity of 144 OR table hours per day. Staffing considerations include the number of surgeons available. Staff include 66Fs, 66Es, and 91Ds. As casualties begin to clear the OR and the pace there slows, nursing personnel will need to be shifted to the Recovery Room and ICUs where the post-operative/post-treatment activity has increased.
  - f. **Minimal Care Wards (MCWs):** Minimal care wards serve as treatment areas for minimal injuries. Staffing considerations: PA or physician, RN staff (if available), 91C staffing.

Psychiatric patients should be placed on the neuropsychiatric wards at hospitals. Combat stress teams should care for battle fatigue patients because they have the expertise in this clinical area.

#### References

- Bowen, T. E., & Bellamy, R. F. (1988). Emergency war surgery (2nd ed.). Washington, DC: United States Government Printing Office.
- DMSB. (1994). DEPMEDS administrative procedures and clinical and support guidelines (3rd ed. draft). Fort Detrick, MD: Author.
- HQDA. (1994). Employment of the combat support hospital: Tactics, techniques, and procedures (FM 8-10-14). Washington DC: Author.
- Wilford Hall Medical Center Medical Readiness Division. (1994). Medical readiness training: Provider handbook. Lackland Air Force Base, TX: Author.

**APPENDIX A**  
**LIST OF TASK SUMMARIES FOR CLINICAL SKILLS**

CLINICAL SKILL	AOC/MOS					
	66H	66E	66F	91B	91C	91D
<b><u>Skills Performed Using Field Medical Equipment</u></b>						
1.01: Operate a cardiac monitor-recorder	X	X	X	X	X	
1.02: Obtain a 12-Lead EKG	X			X	X	
1.03: Operate a field portable oropharyngeal suction apparatus	X		X	X	X	
1.04: Operate a surgical suction apparatus	X	X		X	X	
1.05: Operate a field oxygen delivery system	X			X	X	
1.06: Operate a ventilator	X		X		X	
1.07: Operate a mobile ultrasonic cleaner		X				X
1.08: Operate a field sterilizer		X				X
1.09: Operate a field operating table		X				X
1.10: Operate an electrosurgical apparatus		X				X
1.11: Operate an intermittent suction-aspirator system		X				X
1.12: Operate a pulsed irrigation and suction system		X				X
1.13: Set up a blood recovery and delivery system			X			X
1.14: Operate a blood recovery and delivery system			X			
1.15: Operate an 885A field anesthesia apparatus				X		
1.16: Operate a universal PAC draw-over anesthesia apparatus					X	

CLINICAL SKILL	AOC/MOS					
	66H	66E	66F	91B	91C	91D
<u>Skills Performed Without Automated Equipment or Specialized Support Services</u>						
2.01: Measure CVP using a water manometer system	X			X		
2.02: Measure a patient's oral temperature	X			X	X	
2.03: Measure a patient's blood pressure	X			X	X	
2.04: Prepare an IV additive	X	X				X
2.05: Calculate an oral medication dosage	X			X	X	
2.06: Calculate the flow rate for an IV infusion	X	X		X	X	
2.07: Prepare sterile items for storage			X			X
2.08: Perform high level disinfection			X			X
<u>Skills Performed in an Expanded Role in the Field</u>						
3.01: Triage casualties	X			X		
3.02: Intubate a patient*				X		
3.03: Perform a needle chest decompression*				X		
3.04: Treat a hemorrhaging patient				X		
3.05: Administer blood to a patient				X	X	
3.06: Set up Buck's unilateral leg traction	X			X	X	
3.07: Manage peritoneal dialysis	X					

\* The expert panel selected these advanced clinical skills for training 91Bs who had completed BNCOC. Since the expert panel meetings, personnel at the 232nd Medical Battalion at Fort Sam Houston, Texas have been moving toward training all 91Bs in many advanced clinical skills. Therefore, these advanced skills are presented for training all 91Bs.

## APPENDIX B

### DESCRIPTION OF SKILL STATIONS

Following is a list of the equipment and supplies needed for testing and training the clinical skills described in Chapter 2.

Task 1.01: Operate a Cardiac Monitor-Recorder

Task 1.02: Obtain a 12-Lead EKG

Field table (1).

Hewlett-Packard Cardiac Monitor-Recorder, NSN 6515-01-291-1198, or

Hewlett-Packard Defibrillator/Monitor-Recorder System, NSN 6515-01-291-1199 (1).

Recorder paper (1 roll).

5-lead electrode set (1).

Metal plate limb electrodes (4) with holding straps (4).

Suction cup electrode (1).

Electrode gel (1 tube).

Alcohol pads (1 box).

Hospital bed (1).

Mannequin that has 4 extremities (1).

Task 1.03: Operate a Field Portable Oropharyngeal Suction Apparatus

Field table (1).

Field Oropharyngeal Suction Apparatus, Model 308M, by Impact,

NSN 6515-01-304-6497 (1).

Suction tubing (1).

Suction catheter (1).

Small container of tap water (1).

Gloves (1 pair).

Task 1.04: Operate a Surgical Suction Apparatus

Gomco Model 6053 Surgical Suction Apparatus, NSN 6515-01-259-4307

(2-bottle water-seal system with 1 spare drainage bottle) (1).

Connecting tubing for suction apparatus (1 set).

Rubber-padded large clamps (2).

Sterile water (1 bottle).

Task 1.05: Operate a Field Oxygen Delivery System

Task 1.06: Operate a Ventilator

Field table (1).

"H" oxygen cylinder in secured position (1).

Uni-Vent Model 750 Ventilator by Impact, NSN 6530-01-327-0686.

Required ventilator circuits (1 set).

Oxygen connecting tubing (1).

50 psi pressure regulator for ventilator (1).

Test lung (1).

Cylinder regulator with flowmeter for oxygen delivery system (1).

Christmas tree adapter (1).

Wrench (1).

Nasal cannula with oxygen connecting tubing (1).

Task 1.07: Operate a Mobile Ultrasonic Cleaner

Table (1).

Mobile ultrasonic cleaner, NSN 6530-01-254-4135 (1).

Sonic cleaner (1 bottle).

Minor tray with instruments (1).

Disposable gloves (1 pair).

Task 1.08: Operate a Field Sterilizer

Field sterilizer that is not in standing position, NSN 6530-00-926-2151 (1).

Field sterilizer that has been set up (1).

Minor tray ready for sterilization (1).

Task 1.09: Operate a Field Operating Table

Field operating table, NSN 6530-00-142-9239 (1).

Accessory box containing the table's accessories (1).

Task 1.10: Operate an Electrosurgical Apparatus

Valleylab electrosurgical apparatus, NSN 6515-01-309-6647, or

Birtcher electrosurgical apparatus, NSN 6515-01-269-6056 (1).

Non-disposable patient return electrode (1).

Disposable patient return electrode (1).

Monopolar handpiece (1).

Monopolar foot pedal (1).

Electrode gel (1 tube).

Full-body mannequin (1).

Field operating table, NSN 6530-00-142-9239 (1).

Task 1.11: Operate an Intermittent Suction-Aspirator System

Task 1.12: Operate a Pulsed Irrigation and Suction System

Table (2).

Intermittent suction-aspirator system, NSN 6515-01-267-2726 or

NSN 6515-01-267-2727 (1).

Connecting tubing (1 set).

Filter (1).

Overflow valve (1).

Collection jars (1 set).

Stryker OrthoLav Pulsed Irrigation and Suction System, NSN 6530-01-237-6088 (1).

1-liter IV bag of any solution (1).

IV connecting tubing (1 set).

Stryker disposable large handpiece and tubing set, NSN 6530-01-184-1239 (1).

Disposable straight multiple orifice tip, NSN 6530-01-184-1240 (1).

Large basin with stand (1).

Task 1.13: Set Up a Blood Recovery and Delivery System

Task 1.14: Operate a Blood Recovery and Delivery System

Haemonetics Cell Saver 4 Autologous Blood Recovery System,

NSN 6516-01-240-6883 (1).

Haemonetics Basic Collection Pack, NSN 6515-01-185-2406 (1).

Haemonetics Basic High Speed Cell Saver Pack, NSN 6515-01-169-7785 (1).

Sterile Normal Saline solution, 1 or 3 liter bags (1-2 bags for saline wash lines).

Sterile Normal Saline solution, 1 liter bag (1 bag for heparinized saline solution).

Assembled intermittent suction-aspirator system, NSN 6515-01-267-2726 &

NSN 6515-01-267-2727 (1).

Task 1.15: Operate an 885A Field Anesthesia Apparatus

885A Anesthesia Apparatus in its carrying case, NSN 6515-01-185-8446 (2).

"E" oxygen regulator with green oxygen connector (1).

"D" oxygen cylinders (2).

Carbon dioxide absorption canisters (4).

Pediatric partial rebreathing circuit (1).

Flow calculator (1).

Ohmeda positive end expiratory pressure valve (PEEP valve) (1).

Ohmeda 5120 oxygen monitor, NSN 6515-01-279-6450 (1).

Ohmeda 7000 anesthesia ventilator, NSN 6515-01-116-7903 (1).

"H" oxygen cylinder (1).

Task 1.16: Operate a Universal PAC Draw-Over Anesthesia Apparatus

Table (1).

Complete Universal PAC Draw-Over Anesthesia Apparatus in its carrying case and a low pressure oxygen source with a L/M control valve (1).

Task 2.01: Measure CVP Using a Water Manometer System

Hospital bed (1).

Mannequin with upper extremities (1).

IV pole (1).

1-liter IV bag of any solution (1).

IV connecting tubing (1).

Central Venous Pressure Monitor, Pharmaseal Cat. No. 4338A, unassembled (1).

Small basin (e.g., 1 emesis basin).

Task 2.02: Measure a Patient's Oral Temperature

Task 2.03: Measure a Patient's Blood Pressure

Field table (1) and chairs (2).

1 oral and 1 rectal thermometer, each in a container labeled "Clean Thermometers."

Container labeled "Dirty Thermometers" (1).

Extra thermometer on table for the student to read (1).

Sterile alcohol pads (1 box).

Professional aneroid sphygmomanometer (1).

Professional dual training stethoscope (1).

Task 2.04: Prepare an IV Additive

Task 2.05: Calculate an Oral Medication Dosage

Task 2.06: Calculate the Flow Rate for an IV Infusion

Field table (1) and chair (1).

Piggy-back IV bag (1).

5 cc syringe and needle in sterile wrapper (1).

Medication vial (1).

Blank label (1).

Sterile alcohol pads (1 box).

Written calculation exercises (3).

Pencil (1).

Task 2.07: Prepare Sterile Items for Storage

Table (1).

Wrapped tray labeled as "minor tray" and hermetically sealed (1).

Task 2.08: Perform High Level Disinfection

Table (1).  
Soak pan with cover (1).  
Disinfection solution (1 bottle).  
Heat sensitive item (1).  
Sterile towels (1 package).  
Sterile gloves (1 pair).  
Sterile distilled water (1 bottle).

Task 3.01: Triage Casualties

Chairs (2).  
Written triage scenario with descriptions of the first 4 casualties to be triaged.  
Picture of the hospital layout.

Task 3.02: Intubate a Patient

Hospital bed (1).  
Intubation mannequin (1).  
Laryngoscope (1) with 1 straight and 1 curved blade and 1 stylet.  
6, 7 and 8 mm ET tube (1 of each).  
10 cc syringe in sterile wrapper (1).  
Intubation lubricant (1 can).  
J tube (1).  
Adhesive tape, 1/2" (1 roll).  
Stethoscope (1).  
Bag-valve mask (1).

Task 3.03: Perform a Needle Chest Decompression

Hospital bed (1).  
Mannequin that has chest landmarks visible (1).  
14 and 18 gauge angiocaths or needles in sterile wrappers (1 of each).  
20 cc syringe in sterile wrapper (1).  
Alcohol pads (1 box).  
Adhesive tape, 1/2" (1 roll).  
Condom or sterile glove (1).

Task 3.04: Treat a Hemorrhaging Patient

Hospital bed (1).  
Mannequin with wound marked on lower forearm, just below elbow joint (1).  
Dressing, first aid, field, individual troop, camouflaged, NSN 6510-00-159-4883 (2).  
Bandage, muslin, compressed, camouflaged, NSN 6510-00-201-1755 (2).  
Tongue blades (3).

Task 3.05: Administer Blood to a Patient

Hospital bed (1).  
IV pole (1).  
Blood pack filled with red liquid and labeled with patient information (1).  
1 liter of IV normal saline (1).  
1 liter of any IV solution except normal saline (1).  
1 large basin in which to set the blood pack and IV bag between use (1).  
Blood transfusion recipient set (Y set) (1).  
SF 518 completed with patient information (1).

Task 3.06: Set Up Buck's Unilateral Leg Traction

Hospital bed (1).  
Mannequin with lower extremities (1).  
IV pole for hospital bed.  
Soft padding (1 roll).  
36" x 2" strip of moleskin with adhesive on one side.  
4" elastic bandage (1).  
36" piece of traction cord (1).  
3" x 3" x 3/4" board (1).  
18" strip of stockinette (1).  
Adhesive tape (1 roll).

Task 3.07: Manage Peritoneal Dialysis

Hospital bed (1).  
Mannequin (1).  
IV pole (1).  
1- or 2-liter IV bag of any solution with the label "Peritoneal Dialysate" on the bag (1).  
IV connecting tubing (1 set).  
Simulation of a peritoneal catheter (e.g., 1 empty IV bag tucked under trousers of mannequin with opening of IV bag coming out of trousers).  
Sterile gloves (1 pair).  
Mask (1).  
Sterile gown (1).

## APPENDIX C

### DISTRIBUTION OF TRAINING VIDEOTAPES

Following are the names and Program Identification Numbers (PINs) of the videotapes available for use with the Readiness Training Program for Nursing Personnel:

- I. *Readiness Training in Medical-Surgical Nursing Skills - PIN 710659*  
*(AOC/MOS: 66H, 91B, 91C)*
- II. *Readiness Training in Operating Room Nursing Skills - PIN 710660*  
*(AOC/MOS: 66E, 91D)*
- III. *Readiness Training in Nurse Anesthetist Clinical Skills (AOC 66F) - PIN 710658*

These videotapes and their manuals\* can be obtained from the following authorized Visual Information (VI) libraries (and the US Army Reserve Command as listed):

Aberdeen PG, MD	FORTS	FORTS (cont.)
Anniston AD, AL	Belvoir, VA	McClellan, AL
Bay Area TSC, Oakland, CA	Benning, GA	McCoy, WI
Carlisle Barracks, PA	Bliss, TX	McPherson, GA
Corpus Christi AD, TX	Bragg, NC	Meade, MD
Dugway PR, UT	Campbell, KY	Monmouth, NJ
Lexington Blue Grass AD, KY	Carson, CO	Monroe, VA
Red River AD, TX	Detrick, MD	Myer, VA
Redstone Arsenal, AL	Devens, MA	Ord, CA
Rock Island Arsenal, IL	Dix, NJ	Polk, LA
Savanna AD, IL	Douglas, UT	Riley, KS
Tobyhanna AD, PA	Drum, NY	Ritchie, MD
Tooele AD, UT	Eustis, VA	Rucker, AL
USA Spt Det, Los Alamitos, CA	Gordon, GA	Sam Houston, TX
USA Spt Det, Oakdale, PA	Hood, TX	Sill, OK
Walter Reed AMC, Washington, DC	Huachuca, AZ	Stewart, GA
West Point, NY	Indiantown Gap, PA	OCONUS
Yuma PG, AZ	Irwin, CA	Alaska
US Army Reserve Command Atlanta, GA	Jackson, SC	Hawaii
	Knox, KY	Korea
	Leavenworth, KS	Panama
	Lee, VA	Puerto Rico
	Leonard Wood, MO	USAREUR
	Lewis, WA	

\*The videotapes illustrate a pretest of the clinical skills described in this Training Support Package (TSP). Note that the training objectives which originally appeared in the videotape manuals have been included in Chapter 2 of this TSP in an expanded form for training.

## **APPENDIX D**

### **PROCEDURE FOR SUBMITTING COMMENTS ON THE TRAINING SUPPORT PACKAGE**

The Chief Nurse, FORSCOM, and the Chief, Department of Nursing Science, AMEDDC&S, need your comments regarding your use of this Training Support Package (TSP) when implementing the Readiness Training Program (RTP) in your unit/MTF. Following are the steps to follow in preparing and submitting your comments:

- A. Develop your comments that may be helpful in updating the Training Support Package (TSP). Your comments may include one or more of the following:
  - Recommended change(s) to any component of the Readiness Training Program.
  - Recommended change(s) to implementation of the Readiness Training Program.
  - Revision of existing Task Summaries.
  - Addition of new Task Summaries.
  - Descriptions of both positive and negative training experiences using the TSP.
  - Other information that may be useful in updating the TSP.
- B. Prepare your comments in the following format:
  - Comments (see above).
  - Rationale for recommended changes or reasons for the positive/negative training experiences.
  - References used in preparing comments and/or rationale.
- C. Send the name and address of a point of contact (POC) for your comments. The POC should be someone who can respond to a request for clarification of the submitted comments.
- D. Submit your written comments to one of the following individuals:

Chief Nurse, FORSCOM  
Headquarters, US Army Forces Command  
Building 200  
Fort McPherson, Georgia 30330-6000

Chief, Department of Nursing Science  
AHS, AMEDDC&S  
ATTN: MCCS-HN  
2250 Stanley Road  
Fort Sam Houston, Texas 78234-6140

## **APPENDIX E**

### **GLOSSARY**

#### **Section I: Definition of Terms**

The following terms are defined as used in this Training Support Package (TSP). Terms are presented in the following categories: General, Readiness Training Program (RTP) Components, and Training.

##### General

Active component (AC). "That portion of the US Army in which organizations are comprised of personnel on full-time duty in active military service of the United States" (FM 25-101, p. Glossary-1).

Area of operations (AO). "A geographical area assigned to an army commander by a higher commander. An AO has lateral and rear boundaries, which usually define it within a larger joint geographical area" (FM 100-16, p. Glossary-1).

Combat lifesaver. An individual soldier trained to provide enhanced first-aid care for injuries prior to treatment by the combat medic. "These individuals are nonmedical unit members selected by their commander for additional training to be proficient in a variety of first-aid procedures. A minimum of one individual per squad, crew, team, or equivalent-sized unit is trained. All combat units and some combat support (CS) and combat service support (CSS) units have combat lifesavers. The primary duty of these individuals does not change. The additional duties of combat lifesavers are performed when the tactical situation permits" (FM 8-10-14, p. 1-3).

Combat medic. "The first individual in the CHS chain who makes medically substantiated decisions based on medical military occupational specialty (MOS)-specific training. The combat medic is supported by first-aid providers in the form of self-aid and buddy aid and the combat lifesaver" (FM 8-10-14, pp. 1-1 to 1-3).

Combat service support (CSS). "The focus of logistics at the tactical level of war; the synchronization of essential functions, activities, and tasks necessary to sustain soldiers and their weapons systems in an area of operations; includes but is not limited to that support rendered by service support troops to arm, fuel, fix, move, and sustain soldiers and their equipment" (FM 100-16, p. Glossary-6).

Combat support (CS). "Fire support and tactical assistance provided to combat elements. May include artillery, helicopter, engineer, MP, signal, and electronic warfare" (FM 100-16, p. Glossary-5).

Deployable Medical Systems (DEPMEDS). The hospitalization standardized shelter systems, environmental control units, power generators, and DMSB-approved MES and MMS designed for facilities capable of being located in a desired or required area of operations during a contingency, war, or national emergency. This Tri-Service standardization effort was due to a DOD directive to modernize the theater hospital system. Note that the BAS and medical company (clearing station) are not DEPMEDS treatment facilities (TC 8-13).

Field environment. A setting in which patient care activities are performed outside of a fixed healthcare facility. Examples of a field environment are the battlefield, aid stations, and DEPMEDS treatment facilities.

Fixed healthcare facility. An immobile facility established for the purpose of providing in-patient and/or out-patient medical treatment.

Levels of enemy threat. Enemy forces and their activities in the rear areas as divided into three categories (ARTEP 8-705-MTP, 1991, p. Glossary-16).

Level I - (1) Enemy controlled agent activity. (2) Sabotage by enemy sympathizers.  
(3) Activities conducted by terrorist organizations.

Level II - (1) Diversionary and sabotage operations by unconventional forces.  
(2) Sabotage and reconnaissance missions conducted by tactical units of less than battalion size.

Level III - (Battalion-sized or larger) (1) Airmobile and air assault operations.  
(2) Airborne operations. (3) Ground forces deliberate operations. (4) Amphibious operations.  
(5) Infiltration operations.

Medical treatment facility (MTF). "Any facility established for the purpose of providing medical treatment. This includes aid stations, clearing stations, dispensaries, clinics, and hospitals" (FM 8-10-3, p. Glossary-19).

Nursing personnel. As used in this manual, nursing personnel refers to the following categories of personnel in the active and reserve components of the AMEDD: (a) personnel who function in the field as medical-surgical nurses - 66H; (b) operating room nurses - 66E; (b) nurse anesthetists - 66F; (d) practical nurses - 91C; (e) medical specialists - 91B; and (f) operating room specialists - 91D.

Readiness. The initial abilities of nursing personnel to perform their patient care role when placed in a field environment. This includes the ability of nursing personnel to deploy and employ without unacceptable delays. Readiness is one component of military capability (JCS Pub 1-02).

Readiness competency. The abilities of nursing personnel to perform tasks critical to their patient care role in a deployed or field status. Readiness competency is measured on a continuum which ranges from the novice to the expert level.

Reserve components (RC). "Individuals and units assigned to the Army National Guard or the US Army Reserve who are not in active service but are subject to call to active duty" (FM 25-101, p. Glossary-8).

Self-aid and buddy aid. Aid provided by a soldier who "is trained to be proficient in a variety of specific first-aid procedures with particular emphasis on lifesaving tasks. This training enables the soldier, or a buddy, to apply immediate care to alleviate a life-threatening situation" (FM 8-10-14, p. 1-3).

Theater of operations (TO). "That portion of an area of war necessary for military operations and for the administration of such operations" (FM 8-10-14, p. 1-1).

#### Readiness Training Program Components

Following are definitions for terms used to describe the components of the Readiness Training Program (RTP). These definitions are based on selected Army publications and consultations with expert panel members on the two readiness.

Battle focus. "The process of deriving peacetime training requirements from wartime missions" (FM 25-101, p. Glossary-1).

Battle-Focused Functions (BFFs). Actions performed by nursing personnel in support of patient care or unit management in a field environment. Some BFFs require nursing personnel to interface with the command and control, medical evacuation, or medical supply systems when providing patient care in a field environment. Other BFFs require nursing personnel to apply infection control or sustainment principles to patient care in a field environment. Following are five categories of BFFs that are based on knowledge of these systems and principles:

Command and Control Functions. Actions which require nursing personnel to interface with the command and control system when providing patient care in a field environment. The command and control system is defined as a system designed for "the exercise of command that is the process through which the activities of military forces are directed, coordinated, and controlled to accomplish the mission. This process encompasses the personnel, equipment, communications, facilities, and procedures necessary to gather and analyze information, to plan for what is to be done, and to supervise the execution of operations" (FM 8-10-3, p. Glossary-8).

Medical Evacuation Functions. Actions which require nursing personnel to interface with the medical evacuation system when providing patient care in a field environment. The medical evacuation system is defined as a modern, complex transportation system designed to provide "the timely, efficient movement and en route care by medical personnel of the wounded, injured, or ill persons from the battlefield and other locations to MTFs. . . . Evacuation begins when medical personnel receive the injured or ill soldier and continues as far rearward as the patient's medical condition warrants or the military situation requires" (FM 8-10-6, p. 1-2).

Medical Supply Functions. Actions which require nursing personnel to interface with the medical supply system when providing patient care in a field environment. The medical supply system is defined as the aspect of the combat health logistics system dealing with the procurement, distribution, and storage of medical matériel, including medical-peculiar repair parts (Class VIII supplies) (FM 8-10).

Infection Control Functions. Actions performed to prevent and control infections associated with (a) battle injuries and (b) disease and nonbattle injuries (DNBI) in a field environment. These actions require nursing personnel to apply infection control principles to the practice of nursing in a field environment for the purpose of minimizing infection and its associated disability, morbidity, and mortality.

Sustainment Functions. Actions performed in support of patients, oneself, or other staff to ensure ongoing patient care services in a field environment, to include patient care in aid stations, medical companies, dispensaries, clinics, and hospitals in all levels of care. These actions require nursing personnel to apply sustainment principles to their work in a field environment.

Clinical Skills. Tasks performed when carrying out patient care activities. To perform a clinical skill, nursing personnel must understand the principles underlying skill performance and must have had experience in practical application of the principles to patient care situations.

Basic Skills. Skills performed in the field without automated equipment or specialized support services commonly available in fixed MTFs.

Equipment Skills. Skills performed using field medical equipment, which generally are operated differently from equipment used to perform the same or similar skills in fixed facilities.

Expanded Role Skills. Skills performed by nursing personnel in aspects of their role that are expanded from the fixed facility to the field environment.

## Training

The training terminology used in this Training Support Package is based on TRADOC Reg 350-70, *Training Development Management, Processes, and Products*, 24 Sep 95. Definitions for the following training-related terms have been taken verbatim from the Glossary of TRADOC Reg 350-70.

**After-action review (AAR)**. A professional discussion of an event, focused on performance standards, that enables soldiers to discover for themselves what happened, why it happened, and how to sustain strengths and improve on weaknesses. It is a tool leaders, trainers, and units can use to get maximum benefit from every mission or task.

**Army Training and Evaluation Program (ARTEP)**. The cornerstone of unit training. It is the umbrella program to be used by the trainer and training manager in the training evaluation of units. The ARTEP is a complete program enabling commanders to evaluate and develop collective training based on unit weaknesses, then train the unit to overcome those weaknesses and reevaluate. Success on the battlefield depends on the coordinated performance of collective and individual skills that are taught through the ARTEP MTP.

**Doctrinal literature**. The fundamental principles of doctrine, together with the tactics, techniques, and procedures to implement the doctrinal principles and win on the battlefield. Army doctrinal literature is published in FMs.

**Doctrine**. Fundamental principles by which the military forces or elements thereof guide their actions in support of national objectives. It is authoritative but requires judgment in application.

**Evaluation**. Measurement of the demonstrated ability of soldiers or units to perform a task, and supporting skill and knowledge, or learning objective against the established standard.

**Field Manual (FM)**. A DA publication that contains doctrine that prescribes how the Army and its organizations function on the battlefield in terms of missions, organizations, personnel, and equipment. The level of detail should facilitate an understanding of "what" and "how" for commanders and staffs to execute their missions and tasks. The FM may also be used to publish selected alliance doctrinal publications that are not readily integrated into other doctrinal literature.

**Graphic Training Aid (GTA)**. A Graphic Training Aid (GTA) provides a means for trainers to conduct and sustain task-based training in lieu of using extensive printed material or an expensive piece of equipment. The uses of GTAs range from quick reference memory aids to simulation games for a battalion.

Learning objective (LO). A precise three-part statement describing what the student is to be capable of accomplishing in terms of the expected student performance under specific conditions to accepted standards. Learning objectives clearly and concisely describe student performance required to demonstrate competency in the material being taught. LOs focus the training development on what needs to be trained and focuses student learning on what needs to be learned.

Enabling learning objective (ELO). A learning objective that supports the terminal learning objective. It must be learned or accomplished to learn or accomplish the terminal learning objective. It consists of an action, condition, and standard. Enabling objectives are identified when designing the lesson. A terminal learning objective does not have to have enabling objectives, but it may have more than one.

Terminal learning objective (TLO). The main objective of a lesson. It is the performance required of the student to demonstrate competency in the material being taught. A TLO describes exactly what the student must be capable of performing under the stated conditions to the prescribed standard on lesson completion. There is only one TLO per lesson regardless of presentation method or media and it has only one verb. The terminal learning objective may cover one critical task, part of a critical task (i.e., a skill or knowledge), or more than one critical task. The TLO may be identical to the critical task being taught or there may be a disparity between them. Where there is a disparity, it is the TLO standard that the student must achieve to demonstrate competency for course completion.

#### Mastery.

Training - The performance of the training objectives within the prescribed conditions and to the stated standard.

On the job - Successful task performance without supervision or coaching.

Military Qualification Standards (MQS) Manual. MQS manuals list all common, shared, and branch-specific critical tasks. Officers refer to the MQS manuals to determine critical tasks, professional knowledge, and special emphasis areas required to successfully perform their jobs. These manuals also provide reference courses and job aids to assist in task performance and self-development.

Mission. A series of related tasks that comprise the major capabilities and/or requirements imposed on a unit by its parent organization or table(s) of organization and equipment.

Mission essential task list (METL). A compilation of collective mission essential tasks which must be successfully performed if an organization is to accomplish its wartime mission(s).

Mission Training Plan (MTP). A MTP provides comprehensive training and evaluation outlines, and exercise concepts and related training management aids to assist field commanders in the planning and execution of effective unit training. It provides units a clear description of "what" and "how" to train to achieve wartime mission proficiency.

Performance checklist. The breakdown of an objective into elements that must be correctly performed to determine whether each student satisfactorily meets the performance standards described in the learning objective.

Performance-oriented training. Training in which learning is accomplished through performance or the actual doing of the tasks or supporting learning objectives under specific conditions until an established standard is met.

Performance test. An evaluation of the actual performance of the task or learning objective using the conditions under which it will be performed and the absolute standards for acceptable performance.

Posttest. A test administered after the completion of instruction to determine whether a student has mastered the objectives to the established standard.

Practical exercise (PE). The hands-on application of the performance required in enabling or terminal learning objectives. It gives the student the opportunity to acquire and practice skills, knowledge, and the behaviors necessary to perform the training objective successfully.

Pretest. A test administered prior to instruction to determine how much the student knows and to determine if the student needs to take this particular instruction.

Professional development course. A course designed to prepare commissioned officers, warrant officers, or noncommissioned officers to effectively perform the duties required in assignments of progressively greater responsibility.

Proficiency. Ability to perform a specific behavior (task, learning objective) to the established performance standard in order to demonstrate mastery of the behavior.

Self-study. Individual study by which a soldier learns or reinforces previous learning, on his/her own.

Soldier training publication (STP). Publications that contain critical tasks and other training information used to train soldiers and serve to standardize individual training for the whole Army; provide information and guidance in conducting individual training in the unit; and aid the soldier, officer, noncommissioned officer (NCO), and commander in training critical tasks. They consist of Soldier's Manuals, Trainer's Guides, Military Qualification Standards Manuals, and Officer Foundations Standards System manuals.

Soldier's manual (SM). A manual which lists critical task summaries for a specific MOS and skill level (SL); provides conditions, standards, and performance measures for each critical task; and is the base document for MOS-specific individual task training and evaluation.

Study guide. As the name states, a document that guides the student through the process of studying a lesson or series of lessons. The student can use it for recording notes.

Subject matter expert (SME). An individual who has a thorough knowledge of a job (duties and tasks). This knowledge qualifies the individual to assist in the training development process (i.e., consultation, review, analysis, etc.). Normally, a SME will instruct in his area of expertise.

Task. A clearly defined and measurable activity accomplished by individuals and organizations. It is the lowest behavioral level in a job or unit that is performed for its own sake. It must be specific; usually has a definite beginning and ending; may support or be supported by other tasks; has only one action and, therefore, is described using only one verb; generally is performed in a relatively short time (however, there may be no time limit or there may be a specific time limit); and it must be observable and measurable. The task title must contain an action verb and object and may contain a qualifier.

Collective task. Derived from unit missions. Requires group participation for its accomplishment (e.g., operate an M105 Howitzer). It may also be a mission requirement, such as secure a bridgehead, that can be broken down into supporting individual tasks. It describes the exact performance a unit must perform in the field under actual operational conditions.

Critical individual task. An individual task which is critical.

Critical task. A collective or individual task a unit or individual must perform to accomplish their mission and duties and to survive in war or military operations other than war (MOOTW). Critical tasks must be trained.

Individual task. The lowest behavioral level in a job or duty that is performed for its own sake. It should support a collective task; it usually supports another individual task.

Task summary. A listing in the soldiers' training publications of the conditions, standards, and performance measures, references, and proponent for each individual critical task. Information is extracted from the individual critical task analysis.

Task condition. The task condition describes the field conditions under which the task will be performed. The condition expands on the information in the task title by identifying when, where, and why the soldier performs the task and what materials, personnel, and equipment the soldier must have to perform the task.

Standard. A statement which establishes a criteria for how well a task or learning objective must be performed. The standard specifies how well, completely, or accurately a process must be performed or product produced. The task standard reflects task performance requirements on the job. The learning objective standard reflects the standard that must be achieved in the formal learning environment.

Evaluation guide. The section of the task summary in a soldier's manual which lists the pass/fail performance measures for evaluating the soldier's performance on the task.

Performance measures. The actions that can be objectively observed and measured to determine if a task performer has performed the task to the prescribed standard. These measures are derived from the task performance steps during task analysis.

Technical manual (TM). A publication which describes equipment, weapons, or weapons systems with instructions for effective use. It may include sections for instructions covering initial preparation for use and operational maintenance and overhaul.

#### Training.

Annual training. The minimal period of annual active duty training a member performs to satisfy the annual training requirements associated with a Reserve Component assignment. It may be performed during one consecutive period or in increments of one or more days, depending upon mission requirements.

Collective training. Training, either in institutions or units, that prepares cohesive teams and units to accomplish their missions on the battlefield and in operations other than war.

Individual training. Training which prepares the soldier to perform specified duties or tasks related to assigned duty position or subsequent duty positions and skill level.

Refresher training / Sustainment training. Used to reinforce previous training and/or sustain/regain previously acquired skills and knowledge. The training -

- is related to course-specific training objectives, performed under prescribed conditions, and must meet prescribed performance standards.
- May take place in a course during or outside of Program of Instruction (POI) time.
- Usually takes place in the unit to sustain or retrain a previously required proficiency level; may be trained to prepare an individual for institutional training, i.e., meet prerequisite training requirements.

Unit training. Training (individual, collective, and joint or combined) which takes place outside the Army's institutional base.

Training circular (TC). A publication (paper or computer-based) which provides a means to distribute unit or individual soldier training information that does not fit standard requirements for other established types of training publications. TCs are part of the Armywide Doctrinal and Training Literature Program (ADTLP).

Training management. The process commanders and their staff use to plan training and related resource requirements needed to conduct and evaluate training. It involves all echelons and applies to any unit in the Army regardless of strength, mission, organization, or equipment assigned.

Training method. The procedure or process for attaining a training objective. Examples include lecture, demonstration, discussion, assigned reading, exercise, examination, seminar, and programmed instruction.

Training objective. A statement that describes the desired outcome of a training activity in the unit. It consists of the following three parts: task, condition(s), standard.

Training plan. A detailed description of the actions, milestones, and resources required to implement a training strategy. The detail depends on the plan type and level.

Training program. An assembly or series of courses or other training requirements organized to fulfill a broad overall training goal.

Training resources. Those human, physical, financial, and time resources used to conduct and support training.

Training strategy. The general description of the methods and resources required to implement a training concept. It lays out the who, what, where, when why, how, and cost of the training. The development of a training strategy includes determining the training site and media selected to train each critical task.

Training support. The provision of the materials, personnel, equipment, or facilities when and where needed to implement the training. It includes such functions as the reproduction and distribution of training products and materials, training scheduling, student record maintenance.

Training support package (TSP). A complete, exportable package integrating training products, materials, and/or information necessary to train one or more critical tasks. Its contents will vary depending on the training site and user. A TSP for individual training is a complete, exportable package integrating training products/materials necessary to train one or more critical individual

tasks. A TSP for collective training is a package that can be used to train critical collective and supporting critical individual tasks (including leader and battle staff).

## Section II: Acronyms and Abbreviations

Included in this section are acronyms and abbreviations used in this TSP and their meaning. The acronyms and abbreviations are presented together in alphabetical order. Note that an abbreviation for a term related to a clinical skill is defined only in the task summary in which it is used.

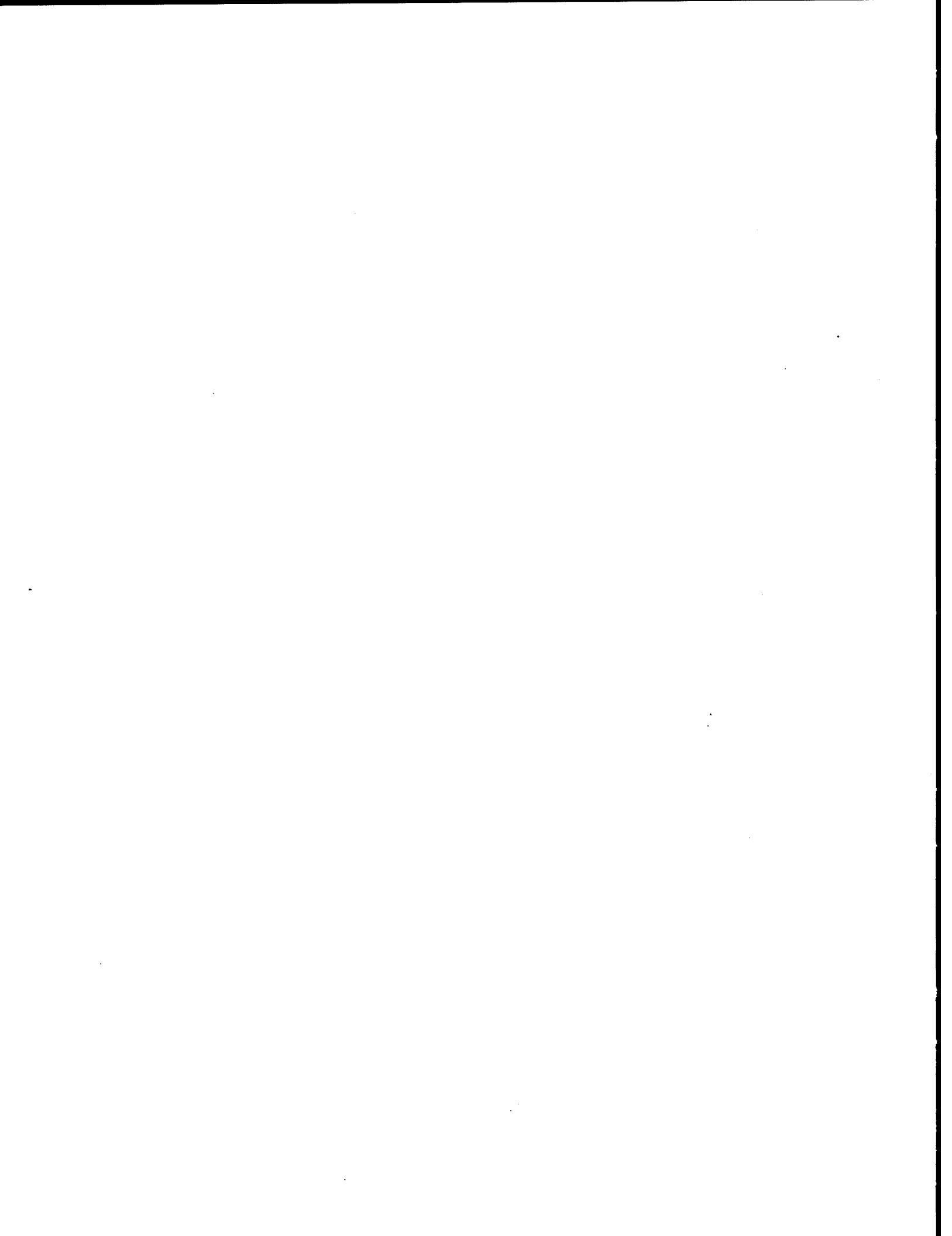
66E	operating room nurse
66F	nurse anesthetist
66H	medical-surgical nurse
91B	medical specialist
91C	practical nurse
91D	operating room specialist
AAR	after-action review
AC	active component
ACR	armored cavalry regiment
AMEDD	US Army Medical Department
AMEDDC&S	US Army Medical Department Center & School
AMOPES	Army Mobilization, Operations, Planning and Execution System
AO	area of operations
AOC	area of concentration
AR	army regulation
ARTEP	army training and evaluation program
ASF	aeromedical staging facility
ASG	area support group
ASMB	area support medical battalion
ASMC	area support medical company
AT	annual training
ATM	advanced trauma management
BAS	battalion aid station
BFF	battle-focused function
BNCOC	Basic Noncommissioned Officer Course
BSA	brigade support area
BTC	blood trans-shipment center
C4	Combat Casualty Care Course
CAGE	Commercial and Government Entity Code

CHES	Center for Healthcare Education & Studies
CHS	combat health support
CINC	commander in chief
CMF	career management field
CMS	central matériel supply
COMMZ	communications zone
CONUS	continental United States
CP	command post
CRO	carded for record only
CS	combat support
CSA	corps support area
CSH	combat support hospital
CSM	command sergeant major
CSS	combat service support
CZ	combat zone
DA	Department of the Army
DEPMEDS	Deployable Medical Systems
DISCOM	division support command
DMSB	Defense Medical Standardization Board
DMSO	division medical supply office
D-MTF	destination medical treatment facility
DNBI	disease and nonbattle injuries
DOD	Department of Defense
DOS	days of supply
DRMO	Defense Reutilization and Marketing Office
DSA	division support area
EAC	echelons above corps
EAD	echelons above division
ELO	enabling learning objective
EMT	emergency medical treatment
EPW	enemy prisoners of war
EUSA	Eighth US Army
FAD	force/activity designator
FH	field hospital
FLOT	forward line of own troops
FM	field manual
FMC	field medical card
FORSCOM	US Army Forces Command
FSB	forward support battalion
FST	forward surgical team

GC	Geneva convention relative to the protection of civilian persons in time of war
GH	general hospital
GPW	Geneva convention relative to the treatment of prisoners of war
GTA	graphic training aid
GWS	Geneva convention for the amelioration of the condition of the wounded and sick in armed forces in the field
GWS Sea	Geneva convention for the amelioration of the condition of wounded, sick and shipwrecked members of armed forces at sea
HQ	Headquarters
HQDA	Headquarters, Department of the Army
HSSA	health services support area
HUB	hospital unit, base
HUH	hospital unit, holding
HUM	hospital unit, medical
HUS	hospital unit, surgical
IAW	in accordance with
ICU	intensive care unit
ICW	intermediate care ward
IDT	inactive duty training
IMSA	installation medical supply activity
ITR	inpatient treatment record
ITRCS	inpatient treatment record cover sheet
JBPO	Joint Blood Program Office
JSNAG	Joint Services Nursing Advisory Group
KIA	killed in action
MASF	mobile aeromedical staging facility
MASH	mobile army surgical hospital
MCN	Management Control Number
Med Log Bn	medical logistics battalion
MES	medical equipment sets
METL	mission-essential task list
MF2K	Medical Force 2000
MMS	medical matériel set
MOS	military occupational specialty
MQS	military qualification standards
MRO	medical regulating officer
MSB	main support battalion

MTF	medical treatment facility
MTOE	modified table of organization and equipment
MTP	mission training plan
NBC	nuclear, biological, and chemical
NCO	noncommissioned officer
NCOIC	noncommissioned officer in charge
NESD	Nursing Education and Staff Development
NP	neuropsychiatric
NSN	national stock number
OBC	Officer Basic Course
OMF	originating medical facility
OPLAN	operation plan
OR	operating room
PA	physician assistant
PAD	patient administrator
PD	priority designator
PMCS	preventive maintenance checks and services
POL	petroleum, oil, and lubricants
PPM	personnel protective measures
PROFIS	professional filler system
PTM&S	Plans, Training, Mobilization, and Security
RC	reserve components
RTD	return to duty
RTP	Readiness Training Program
RTS-MED	Regional Training Site-Medical
SB	supply bulletin
SIMLM	single integrated medical logistics manager
SM	soldier's manual
SME	subject matter expert
SOP	standard operating procedure
STP	soldier training publication
TA	theater army
TAACOM	theater army area command
TAMMIS	Theater Army Medical Management Information System
TB	technical bulletin
TC	training circular
TDA	tables of distribution and allowances

TLO	terminal learning objective
TM	technical manual
T-MRO	theater medical regulating officer
TO	theater of operations
TOC	tactical operations center
TOE	tables of organization and equipment
TRADOC	US Army Training and Doctrine Command
TSOP	tactical standard operating procedure
TSP	training support package
UAL	unit assemblage listing
UND	urgency of need designator
US	United States
USAF	US Air Force
USAMMA	US Army Medical Matériel Agency
USARC	US Army Reserve Command
USAREUR	US Army, Europe and Seventh Army
USARPAC	US Army Pacific
WIA	wounded in action



## APPENDIX F

### REFERENCES

Following are general references used in the preparation of this Training Support Package (TSP), including references cited in Chapter 1 and the Glossary. References specific to a task summary are included with the task summary itself in Chapters 2 and 3.

DA. (1995). Training development management, processes, and products TRADOC Reg 350-70). Fort Monroe, VA: HQ, United States Army Training and Doctrine Command.

DMSB. (1994). DEPMEDS administrative procedures and clinical and support guidelines (3rd ed. draft). Fort Detrick, MD: Author.

HQDA. (1988). Training the force (FM 25-100). Washington, DC: Author.

HQDA. (1990). Battle focused training (FM 25-101). Washington, DC: Author.

HQDA. (1990). Deployable medical systems: Tactics, techniques, and procedures (TC 8-13). Washington, DC: Author.

HQDA. (1991). Health service support in a theater of operations (FM 8-10). Washington, DC: Author.

HQDA. (1991). Medical evacuation in a theater of operations: Tactics, techniques, and procedures (FM 8-10-6). Washington, DC: Author.

HQDA. (1991). Mission training plan for the combat support hospital (ARTEP 8-705-MTP). Washington, DC: Author.

HQDA. (1993). A leader's guide to after-action reviews (TC 25-20). Washington, DC: Author.

HQDA. (1993). Unit status reporting (AR 220-1). Washington, DC: Author.

HQDA. (1994). Employment of the combat support hospital: Tactics, techniques, and procedures (FM 8-10-14). Washington, DC: Author.

HQDA. (1995). Army operational support (FM 100-16). Washington, DC: Author.

HQDA. (1995). Division medical operations center: Tactics, techniques, and procedures (FM 8-10-3, final draft). Washington, DC: Author.

US Joint Military Terminology Group. (1989). Department of defense dictionary of military and associated terms (JCS Pub 1-02). Washington, DC: Author.

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